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A
MONOGRAPH
OF THE
Broad-winged Hawk
(*Buteo platypterus*)

BY
FRANK L. BURNS

With the co-operation of over one hundred American
ornithologists, and the compilation of the
world's literature.

BERWYN, PENNSYLVANIA
1911

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By Lynds Jones



BROAD-WINGED HAWK (*Buteo platypterus*)

Adult female

(Photographed by Alfred C. Redfield)

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BROAD-WINGED HAWK

(Photo by Isaac E. Hess)

PREFACE.

Twenty-two years of personal observation and five years of close study of the literature of the subject of this paper, is perhaps none too long for the object in view, namely the inclusion in a single volume of the sum of our present knowledge of the life history of the species. In its ninety-eight years of history, the Broad-winged Hawk has always been considered rather rare, and for this, more than any other reason, perhaps, it has received a far greater amount of attention in a literary sense than the experience of the average observer would seem to warrant. With chastened spirit, one may trace many of the inaccuracies step by step back to the original statement. Even with the expectation of a vast amount of reiteration, and the possession of the saving sense of humor, the lack of originality of so many writers in reference to this species is all too painfully evident. I therefore point to the above in excuse for my frequent sacrifice of brevity in an honest endeavor to cite all statements in as nearly the exact words of the observer consistent to plain, comprehensive language. This has been a co-operative work, as well as a compilation of all the literature obtainable, and the credit has been given in the text wherever it is due. I am greatly indebted to the following persons for notes, specimens, excerpts, citations, photographs, or other assistance:

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With a few exceptions, the method of treatment requires no further comment than the various sub-heads afford. Ridgway's "Nomenclature of Colors" is the standard for all color descriptions, and for obvious reasons the measurements of skins are given in millimetres following the English inch and hundredth thereof, but for the nest and egg measurements, the latter is employed exclusively because consistency requires uniformity throughout "Nidification," including distances from nest to ground. Knowing that the metric system is practically meaningless to the American oologist, it has been omitted. As far as the literature with its often contradictory reports can be relied upon, supplemented by the manuscript notes in which several state and numerous county records are for the first time recorded, both the past and present status of the species is indicated under the head of "Geographical Distribution," which should be used in conjunction with the "Bibliography." The importance of the latter, if measured by the time and trouble it took to secure the more than seven hundred titles, is not to be told in words. The writer assumes the responsibility for the correctness of all citations not otherwise accredited. Palpably erroneous records are here corrected and with all doubtful ones, are excluded from the body of the work. In conclusion I would beg that my studied omission of all personal titles which would involve tiresome repetition, should not be attributed to a lack of respect and civility.

FRANK L. BURNS.

Berwyn, Pa., Feb. 23, 1911.

Broad-winged Hawk

Buteo platypterus

Diagnosis of Genus.

The *Buteos*, Buses or Buzzard-hawks, forming the central or typical genus of the Accipitrinæ, are found more or less numerously in all parts of the world except Australia. Difficult of definition except by process of exclusion. Form robust and heavy, flight vigorous and sustained. Bill short, wide at base, intermediate between that of *Astur* and that of *Parabuteo*. Tarsi and toes moderate and robust, claws strong. Wings long and rather pointed, the third to the fifth quill longest, the first shorter than the eighth, outer three or four with inner webs emarginate. Tail moderate, rather wide, from slightly rounded to almost even. In the adult plumage the best specific characters may be found in the color and markings of the tail. The synonymy of the genus is as follows: *Buteo* Lacepede, Tableaux Ois., 1799. Type *Falco buteo* Linnaeus, S. N. ed. 10, I, 1758, 90. *Buteo buteo* Licht. Nomencl. Mus. Busl. 1854, 3; European Buzzard.

Distinguishing Specific Characters.

Buteo platypterus may be readily distinguished from *Buteo swainsoni* and *B. albicaudatus*, by its smaller size, its shorter wings, the tips of its primaries reaching only to the middle of its tail, and by its fewer and comparatively distinct tail bars; from *B. brachyurus*, by its well marked underparts; and from all other species of North American *Buteos*, by its three primaries emarginated on the inner web.

Description and Measurements.

The juvenile or first year phase of *Buteo platypterus platypterus* may be easily recognized by the broad rufous or rusty edging of the upper parts, the longitudinal markings



BROAD-WINGED HAWK (*Buteo platypterus*)

Juvenile female "Nip." April 5, 1908

(Photographed by Alfred C. Redfield)

of the lower parts, and the five to seven dark bars on the tail. The second year plumage by the transitional markings beneath, and of the four or five dark bars on the tail, the outer pair frequently as in the first year. In the adult there is considerable individual variation. In the United States the dark phase appears constant in the fall, and I have met with the gray-brown phase only in spring and early summer, and then considerably abraded as from wear and weather. Of the series of skins in the Academy of Natural Sciences of Philadelphia, a single adult taken at Brownsville, Texas, is the only spring example of the dark type, and even in this the mantle is grey; an immature taken about the same time from that locality is very pale. "In the adult the principal variation is in the continuity or distinctness of the anterior light band on the tail, and the extent and depth of the brown beneath. The first is characteristic of most specimens; it is broadest and most conspicuous, as well as less concealed by the coverts, in the females, and this appears to be the principal sexual difference." Ridgway. Excepting Cuban and perhaps Porto Rican specimens, there appears to be no consistent geographical variation. Two Florida birds differ not at all from the northern examples. Riley states that he has found no individuals corresponding to the gray-brown phase in a series of Cuban skins, but that the dark phase is hardly or not at all different from the eastern United States examples. The most constant differentiation between the Continental and the Lesser Antillean forms, aside from the size, appears to be in the number and width of the barring of the thighs, the latter forms averaging narrower.

An adult sexed as a female, taken at Bayote, Santiago de Cuba on Feb. 2, 1906, has the upper plumage seal brown narrowly edged with russet, fading into sepia on wings and mantle; upper tail coverts seal brown, barred with white and narrowly tipped with wood brown. Underparts pale buff to white, banded with mars brown, confluent on breast; thighs and tibæ buff, banded with russet; under tail coverts

buff white with obovate spots of wood brown; lining of wings buff imperfectly banded with russet. Wing—10.50 (266). Tail—6.25 (159). Tarsus—2.16 (55). Middle claw—.69 (17). Hind claw—.78 (20). Bill from cere—.80 (20). Cere—.44 (11). A juvenile male taken at Holguin, Santiago, Cuba, Aug. 5, 1904, is not at all different from my local birds of the same age, except the dark upper plumage covers the white bases more perfectly, the abdomen is almost spotless and the thighs have heavier obovate markings. The measurements exceed that of my Salem, N. J., example of perhaps six weeks less growth, in all but tarsi and talons, which are less. The Cuban differs from the Continental bird in being slightly smaller, lacking the grayish phase of upper plumage and also seems to be comparatively heavier marked on thighs and lining of wings, our typical form frequently has the wing lining immaculate. On the other hand a specimen from Moose Factory, Hudson Bay, is as heavily marked on the thighs as the bird from San Diego, de los Banos, Cuba, in the National Museum; though as J. H. Riley points out to me, the latter seems to have fewer bars. I have not a large suite of skins to prove the difference between the mainland and island birds, between which no communication exists apparently. To justify recognition of a Cuban form the difference would have to be fairly constant. It must be remembered, however, that of the St. Vincent and Dominican birds examined by Clark and Verrill, upon which they based their forms, every one was taken in September and October, presumably at the time of the darkest phase; and the single adult from Antigua upon which Riley bases his form, was taken in May when pale, faded out specimens might reasonably be looked for in this species. Nevertheless all appear worthy of separation, as the Cuban and Porto Rican bird will eventually, and for which I offer *Buteo platypterus cubanensis*. Sub-spec. nov.

The average measurements of a series of 37 specimens taken on the mainland, follows:

	Length	Extent	Wing	Tail	Tarsus	Bill from cere	Cere	Middle Claws
15 Males—	15.41 (417)	34.45 (875)	10.48 (286)	6.44 (164)	2.46 (62)	.70 (18)	.43 (11)	.58 (15)
22 Females—	15.98 (431)	35.57 (903)	10.94 (278)	6.46 (164)	2.56 (65)	.75 (19)	.46 (12)	.63 (16)

Primary formula—4-3-5-2-6-7-8-9-10-1. Lores whitish with black bristles, the latter extending in a thin line on malar apex and under chin (mental apex); rectrices narrowly tipped with wood brown, in all specimens. About fifty per centum of the adult and second year birds examined personally, had yellow or straw-colored irides; but collectors of greater experience state that brown is the usual color in North America. In Cuba, Gundlach gives it as ochraceous with an inclination to dark gray; Riley notes the color on three eastern Cuban specimens is given as straw yellow with a brownish wash, while in two apparently fully adult birds shot by Palmer and himself in western Cuba, the irides were brown; and of two skins in my own collection taken in Santiago de Cuba, the adult is labeled "iris yellowish, brownish near pupil," juvenile "gray brown." The Porto Rico specimens show ochraceous-yellow, with a gray wash—Gundlach. United States of Columbia—male and female, brownish yellow—Sclater. Northeastern Peru, female, light chestnut brown—Taczanowski. Ecuador, light hazel brown, Berlepsch and Taczanowski; female, whitish, brownish in lower part—Taczanowski and Berlepsch. dirty white—Sclater. Rarely, both ovaries are developed in females, and as Bishop suggests, may account for some unusually large "males." The peculiar malformation of a supernumery toe has been noted once by Coale, and twice by Beebe.

Buteo platypterus antillarum "differs from the Cuban series principally in size, being smaller; in having the throat generally darker and the barring on the thighs averaging narrower; there are apparently no other differences."—Riley. According to Clark the irides of the St. Vincent bird are yellowish-white in all stages, and it is given by Lister as yellow.

Buteo platypterus rivierei.—“The series from Dominica are darker than specimens from St. Vincent, more sooty above, more heavily marked below, and with the bars darker. In size there is very little difference between St. Vincent and Dominica specimens. This is probably a fairly well-marked insular form, depending upon its darker coloration for recognition.”—Riley. The irides “are white or pale straw at all ages and in both sexes”—Verrill. Ober, however, gives it as umber—Lawrence.

Of *Buteo platypterus insulicola* the describer states: “The adult is much lighter and smaller than *B. p. antillarum*, and the bars below are narrower and less sharply defined. It is certainly a well-marked insular race, not coming into close contact with any of its relatives on the north or south.”—Riley.

BUTEO PLATYPTERUS PLATYPTERUS.

Natal Down, Young, One Day Old.—Well covered with the palest possible yellowish-white down, bill blue-black, cere very pale yellow, edge of mouth, feet and tarsi flesh color, irides blue-black. Examples: Berwyn, Pa., June 12, 1901; Daylesford, Pa., June 3, 1906.

Juvenile First Year, Male.—Upper parts deep rich brown, almost black; head, hind neck and back edged with rufous, the basal portion being pure white; primaries and secondaries fading on the inner webs to white and barred with deep brown, tipped with gray; tail clove brown fading on inner webs to white, with six bars of deep brown about one-quarter of an inch wide, except terminal bar, which is from half to three-quarters of an inch wide and narrowly tipped with ashy white; upper tail coverts white tinged with rufous on outer vane and imperfectly barred with deep brown. Beneath impure cream buff with guttate spots of fuscous clustering on breast, sides and flanks; abdomen and under tail coverts immaculate; tibæ vermiculate near body, aciculæ near heel; throat with a few pencilings of deep brown; incipient malar stripe dusky brown; under primary coverts

white faintly stained with buff and spotted irregularly with deep brown; lining of wings cream-buff unspotted with the exception of bend of wing—deep brown arcular spots. Irides pearl gray. Bill and claws black. Feet and tarsi yellow ochre.

Length 14.75 (375). Wing 9.05 (230). Spread 33.00 (838). Tail 6.25 (158). Tarsus 2.51 (64; middle claw .54 (14); hind claw .06 (17). Bill from cere .66 (17; nostril to tip .63 (16). Cere .38 (10). Weight 9½ oz. About two months old. No. 889, coll. F. L. B., Salem, N. J., Aug. 9, 1905.

Juvenile, First Year Female.—Upper part rich clove brown; outer webs of primaries, secondaries and rectrices barred with black or very deep brown, inner vanes fading to white and barred with deep brown; wing coverts, greater and middle, edged with wood brown; rectrices fading to pale cream on outer webs, and nine dark bars; upper tail coverts broken bars of clove brown on white of outer webs; hind head narrowly tipped with cream and three-quarters basally; sides of head pale cream tipped with clove brown; malar clove brown; chin pale cream with center penciling of brown; breast, sides, abdomen and under tail coverts white, posteriorally immaculate, anteriorally broken ovate spots of olive; tibiæ pale wood brown, handsomely marked with cordate spots; lining of wings pale wood brown with olive markings, lanceolate and acicular in form; axillars broken spots of olive; under primary coverts pale cream white, spotted with olive. Irides wood brown. Beak and talons black, under mandible fading to gray posteriorally. Cere, feet and tarsi yellow ochre.

Length 14.70 (373). Wing 9.25 (235). Spread 33.25 (846) broken and worn at tips. Tail 6.10 (155). Tarsus 2.71 (69). Middle claw .54 (14); hind claw .75 (19). Bill from cere .73 (19); from nostril .73 (19). Cere .51 (13). Weight 1lb. 1 oz. 8½ months old. Berwyn, Pa., Feb. 16, 1907 (captive). Coll. F. L. B.

This specimen was raised in a large cage in the open air and lost by abrasion the rufous edging to the feathers of the upper plumage. It is in all respects a bird of the year, no winter moult having occurred.

First Nuptial, Second Year Male.—Upper parts deep vandyke brown, almost black, fading to hair brown on scapulars, and confined to narrow bars and edgings on primaries, secondaries and tertials, the bars often ending in russet on the inner webs which are two-thirds white except at the tips; hind neck basal three-quarters white; sides of neck, middle of the back, scapulars, greater and middle wing coverts edged with mars brown; upper tail coverts rich vandyke tipped and barred with soiled white or else hair brown; tail hair brown fading on inner vanes to white, crossed by four bands of deep vandyke brown. Beneath soiled cream-buff with lanceolate markings on throat, and large imperfect cordate spots on breast, sides and abdomen, confluent on sides of breast, of pure vandyke and burnt umber; narrow malar stripes of clove brown; under tail coverts of soiled white with narrow spots, mainly sagittate, of clove brown; lining of wings cream. Irides pearl gray. Beak and talons black. Feet and tarsi yellow ochre. Cere yellow ochre.

Length 14.50 (365). Wing 9.75 (247). Tail 6.25 (158). Tarsus 2.58 (65). Middle claw .56 (14); hind claw .66 (17). Bill from cere .65 (17); from nostril .50 (17). Cere .41 (.10). Weight 13 oz. 15½ months old. Berwyn, Pa., Sept. 26, 1908. No. 925, coll. F. L. B.

First Nuptial, Second Year, Female.—Upper parts fuscous, narrowly tipped with rufous; basil portion of nape pure white, sides of head with lateral streaks of ashy and rufous; exposed parts of primaries deeper fuscous or vandyke brown, indistinctly barred with ashy on the outer web and the fuscous forming bars on the white inner web from the notches to insertion; secondaries and coverts fuscous, fading gradually toward the edges to ashy; upper tail coverts tipped and banded with white; tail vandyke brown, with four bands of grey, white on inner web; the last band indistinct and fading terminally into white, the second one-half to three-quarters of an inch wide, and the basal about one-quarter of an inch wide and partly concealed by the coverts; the outer

pair of rectrices similar to that of young, indistinctly crossed with seven ashy bars; inconspicuous mustache of fuscous running from rictus across cheek; underparts white; chin, throat and breast suffused with pale buff and streaked with brownish-rufous, becoming oval on breast, and cordate and transverse on flanks; under tail coverts white, unspotted; lining of wing delicate cream-white with dusky acicular markings; under primary coverts white with cordate spots of fuscous; tibiæ buffy-white with cordate spots of rufous. Irides Naples yellow, obscured on the inner rim by a semi-transparent raw umber stain. Bill—upper mandible-black, fading to a plumbeous about the base; and lower mandible plumbeous and intensifying to dull black from anterior half.

Claws black. Feet and tarsi yellow ochre. Length 15.60 (396). Wing 10.60 (269). Spread 34.55 (877). Tail 6.10 (155). Tarsus 2.64 (67). Middle claw .73 (18). Bill .77 (21); nostril to tip .65 (16). Cere .33 (8). Weight 1lb. 3½ oz. No. 883, coll. F. L. B., Berwyn, Pa., Apr. 27, 1906.

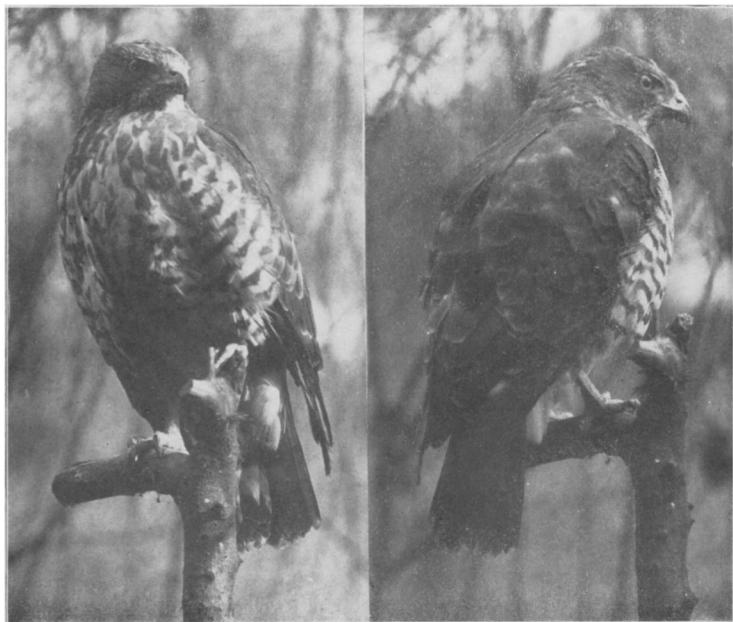
Another example—Upper parts light olive, deeper brown on back, primaries and secondaries broadly tipped and narrowly barred, and wing coverts centered with same, the last edged with broccoli brown; back of neck edged with cinnamon; tail broccoli brown fading into pearl gray on inner vane and crossed by three broad bands of deep brown, narrowly tipped with pearl gray, outer pair broken in numerous barring as in first year bird. Beneath white, broken by transverse markings on the breast, of dull rufous, shafts deeper; throat yellowish-white, streaked with burnt umber; malar deep brown; tibiæ wood brown barred with rufous; under primary coverts white barred with olive; lining of wing cream-buff, occasionally streaked with tawny olive. Irides yellow. No. 64, coll. F. L. B. Berwyn, Pa., May 11, 1888.

Adult Female, Dark Phase.—Upper plumage deep rich vandyke brown almost black, fading to wood brown in narrow edging and mottling on wings and mantle, narrow edging of russet or mars brown between shoulders, mantle, coverts, sides of neck, nape and sides of head, growing almost

wood brown anteriorally; inner webs of quill feathers of wings above emargination wood brown, fading to pure white and imperfectly barred with deeper brown; tail coverts pure white barred with clove brown; broad malar and narrow streaks at the middle of the throat clove brown. Beneath soiled white, from chin to and including breast, and cream-buff to tail; wood on tibæ, spotted with prout's brown in hour glass markings on breast almost confluent, cordate below less frequent; under tail coverts unspotted; chin and throat have a few acicular markings; lining of wings, axillaries and under primary coverts buff with sagittate spots in mars brown except last, which are dusky. Beak and talons black. Cere, feet and tarsi yellow ochre. Irides yellow.

Length 16.00 (406). Spread 35.50 (901). Wing 10.90 (276). Tail 7.00 (177). Tarsus 2.83 (71). Middle claw. .65 (16); hind claw .70 (17). Bill from cere .76 (19); bill from nostril .70 (17). Cere .52 (13). Third season. No. 349, coll. F. L. B., Newton, Delaware Co., Pa., Sept. 1, 1892.

Adult Male, Gray-brown Phase.—Type, Academy of Natural Sciences, Philadelphia, No. 1551. (Orig. No. 407). Philadelphia, May 6, 1812. Collected by Alexander Wilson. "Length fourteen inches, extent thirty-three inches; bill black, blue near base, slightly toothed; cere and corners of the mouth yellow; irides bright amber; frontlet and lores white from the mouth backwards runs a streak of blackish brown; upper parts dark brown, the plumage tipped, and the head streaked with whitish; almost all the feathers above are spotted or barred with white; but this is not seen unless they be separated by the hand; head large, broad and flat; cere very broad, the nostril also large; tail short, the exterior and interior feathers somewhat the shortest, the others rather longer, of a full black, and crossed with two bars of white, tipped also slightly with whitish; tail coverts spotted with white; wings dusky brown, indistinctly barred with black; greater part of the inner vanes snowy; lesser coverts, and upper part of the back tipped and streaked with bright ferruginous; the bars of the back are very distant on the lower side of



BROAD-WINGED HAWK (*Buteo platypterus*)

Adult female "Nip." Nov. 21, 1909

(Photo by Alfred C. Redfield)

the wing; lining of the wing brownish white, beautifully marked with small arrowheads of brown; chin white, surrounded by streaks of black; breast and sides elegantly spotted with large arrow-heads of brown, centered with pale brown; belly and vent, like the breast, white, but more thinly marked with pointed spots of brown; femur brownish white, thickly marked with small touches of brown and white; vent white; legs very stout, feet coarsely scaled, both of a dirty orange yellow; claws semi-circular, strong and very sharp, hind one considerably the longest." Alexander Wilson, *American Ornithology*, VI; 1812, p. 93.

Adult Female, Gray-brown Phase.—Upper parts wood brown, with seal brown centers, especially on head, neck and middle of back; primary secondary and tertial bars and tips seal brown, save a narrow border on tips which shows a very light wood brown conspicuously, also on the inner webs which fades to pure white; basal three-quarters of nape white as usual, and feathers of sides and neck edged narrowly with russet; tail gray with three broad bands of deep seal brown, and upper tail coverts tipped and barred with white; broad malar, and lanceolate streaks of deep brown on chin and throat. Below white, with the sides, flanks and abdomen banded with brownish-gray; breast and jugulum except upon center, same color almost solid and with shafts much deeper; under tail coverts unspotted, tibæ lighter cordate in wood brown; under wing coverts, axillars and primary coverts ivory-white with a few sagittate spots of clay color. Irides straw color. Bill and talons black. Cere, feet and tarsi yellow ochre.

Length 15.75 (400). Spread 35.75 (907). Wing 10.30 (261). Tail 6.75 (171). Tarsus 2.52 (62). Middle claw .67 (17); hind claw .67 (17). Bill from cere .78 (20); from nostril .73 (18). Cere .43 (11). Aged three or more years. No. 547, coll. F. L. B., Bradford Hills, Chester Co., Pa., Apr. 16, 1895.

MELANISM.—The melanistic phase is not wanting, though with one possible exception, all examples have appeared in Iowa, Minnesota and Manitoba. On Feb. 23, 1908, Mr. J. H.

Riley saw a very dark bird pass almost directly overhead at Fall Church, Va. He informs me that he had a fairly good look at it, and that it had some white on the breast, but appeared to be very dark otherwise; whether upon being shot it would be as dark as it appeared, it would be hard to say. Worthen mentions one specimen from Minnesota, of a solid dark umber, showing dark bars on tail and primaries; and Seton another collected by A. Calder, Apr., 1907, Winnipeg, Manitoba, sex not stated; fortunately, however, I am able to give descriptions of perfect specimens of both male and female:

Male.—Portage la Prairie, Man., May 30, 1900; coll. Geo. E. Atkinson. It was found in company with another in normal plumage which was not collected. This specimen was in excellent plumage, entirely sooty black and very dark brownish, except the light tail bars. The entire head, above and below, is as dark as the breast. Length 16.00 (406). Wing 11.00 (279). Tail 6.50 (165). Atkinson ms.

Female.—Crystal Lake, Hancock Co., Iowa, May 3, 1883, No. 107,427 U. S. National Museum. Collected by J. W. Preston. "Plumage of head, neck and body, entirely continuous dark sooty brown, without the faintest indication of markings even on the lower tail-coverts or lining of wing; back darker, with a chalky cast in certain lights. Wings similar to the general plumage, but somewhat lighter brown, on account of paler, but not well defined, borders of feathers; secondaries lighter brown than coverts, without a trace of markings except near the end, when crossed by a broad dusky subterminal band and very narrow paler terminal margin; primaries uniform dusky brown on outer webs, growing gradually blackish terminally, inner webs of the three outer quills chiefly white anterior to their margination (the portion near the shaft brownish), the white crossed by several very distinct but irregular bands of blackish; inner webs of remaining primaries and also of secondaries brown, with a greater or less number (according to the length of the feather) of dusky bands, the webs mottled with whitish

along the edge. Upper tail-coverts with concealed pale grayish brown, crossed at about 1.50 in. from the end by a broad band (about 1 in. wide) of brownish-gray, becoming white on the edges of inner webs, and approaching white on the anterior portion of the band on the middle rectrices; another much narrower and much less distinct dull grayish band crosses the tail about 4.75 in. from the tip, the portion on inner webs more or less whitish on some of the feathers, but on none extending clearly to the edge of the webs; extreme base of the tail light sooty grayish. Feathers of the head, neck and body, above and below, sooty grayish beneath the surface, the extreme base even scarcely approaching white; the feathers of the entire occiput, however, abruptly snow-white for about the basal half. Forehead entirely sooty blackish, but anterior portion of the lores grayish white, finely streaked with black. Wing 11.50 (291). Wing form. 3, 4-5-2-6-7-8-9-1, 10; outer three primaries abruptly and deeply emarginated on inner webs; tail 7.00 (178); culmen. 80 (20); tarsus 2.40 (61); middle toe 1.40 (36). Mr. Preston says: 'This is the third specimen that I have seen, 12 years since my attention was called to a peculiar little black hawk flying with a number of *B. pennsylvanicus*. In the spring of 1884 I came very near securing another which was in migration with others of the species. The present example was shot by myself in a small oak grove. A number of Broadwings were sheltered in the woods at the time, as a cold storm prevailed. Ova much enlarged and iris red.' Ridgway.

BUTEO PLATYPTERUS ANTILLARUM.

"Type—From Chateaubelair, St. Vincent (British West Indies), Sept. 24, 1903, No. 12,825, male adult, coll. E. A. and O. Bangs. Characters—Somewhat similar to *Buteo platypterus* Vieill., but smaller and more rufous, the rufous edgings to the feathers above wider, the underparts more rufous, and the thighs buff, more thickly barred than *B. platypterus*. In the young the ground color below is buffy-white, becoming darker on the abdomen and thighs. Iris

yellowish white in all stages, not brown as in *B. platypterus*. Cere yellow. Feet orange yellow. Bill dark slaty.

Male—Wing, (9.45-9.77) 240-248; Tail (5.99-6.07) 152-154; Tarsus (2.09-2.17) 53-55. Female—Wing, (9.97-10.71) 253-272; Tail (5.95-6.50) 151-165; Tarsus (2.09-2.17) 53-55." Austin H. Clark, Proc. Biol. Soc. Wash., XVIII, Feb. 21, 1905, 62.

Later a more comprehensive description is given: "Above brown, the feathers white at the base and margined with rufous to the tips, the white bases showing through the nape, and giving that region a mottled appearance. Wing coverts margined all around with rufous, lores whitish; head brown all around, the feathers margined with rufous, being darkest at base of bill and under eyes. Throat light buff, more heavily toward abdomen, which is mainly light buff, barred with rufous brown. Under tail coverts light buff. Thighs buff, barred with many transverse lines of rufous. Under wing coverts buff like thighs, many of the feathers having small black central streaks. Upper tail coverts tipped with white. Tail brown, tipped with light grayish brown, with white at the extremity, crossed by two bands and an indicated third band of light grayish brown, becoming white on the inner webs of the feathers. Iris yellowish-white; cere yellow; feet orange; bill dark slaty." Clark, Proc. Boston Soc. Nat. Hist., XXXII, No. 7, Oct. 1905, 241.

BUTEO PLATYPTERUS RIVIEREI.

Dominica, West Indies. Type specimens in the collection of Dr. L. B. Bishop, New Haven, Ct. Original description: "Much smaller, darker, and with relatively heavier feet and legs than any other form. Adults: Above deep umber or dusky brown or even blackish. Back, scapulars and upper wing coverts always edged with deep rusty or rufous. Primaries plain dusky on outer webs pure white with no indication of darker bars. Under wing coverts rich rusty or ochreous with narrow median lines and subterminal bars of dusky. Upper tail coverts broadly tipped with white. Tail feathers dark grayish or dusky, crossed below by about six white,

and above by three or four brownish gray, bands. Occiput, forehead, crown and neck, deep umber brown; each feather edged with dark rufous and often with medial streaks of the same color. Lower parts whitish, becoming rusty on flanks, sides and lower tail coverts and rich rufous on chest, thickly and heavily marked with hour-glass shaped patches of rich ferruginous or sienna brown; the markings becoming confluent on chest and sides and forming narrow distinct bars on flanks and thighs. Lower neck, throat, loral region and sides of head, deep rufous brown with indistinct narrow longitudinal lines of darker umber brown. Chin pale rufous, contrasting sharply with dark dusky mustache. Young: Above, much as in adult. Below, ochreous or pale rufous; lighter posteriorly and more heavily marked with tear-shaped umber brown spots most numerous on chest. Eyes white or pale straw at all ages and in both sexes. Bill bluish horn color; cere yellowish or sap green. Feet and legs greenish-yellow.

Length 13. to 16. (330 to 406), Wing 8.50 to 9.50 (216 to 241); Tail 4.72 to 5.50 (125 to 140). Culmen .90 to 1.10 (23 to 41). Tarsus 1.20 to 1.50 (30 to 38). Middle toe 1.25 to 1.60 (32 to 40)." A Hyatt Verrill, Addition to the Avi-fauna of Dominica, West Indies [Oct. 1905, unpaged].

BUTEO PLATYPTERUS INSULICOLA.

"Type, U. S. National Museum, No. 119,349, male adult, Antigua, British West Indies, May 29, 1890. Collected by Cyrus S. Winch. Frontal apex, lores, and a narrow line above and below eye whitish, with some stiff black bristles; top of head and auriculars grayish brown, with darker shaft streaks; rictal streak darker; occiput white, with the feathers tipped rather broadly with sooty brown; back and rump blackish brown, the feathers of the upper back barred at their bases with white, and slightly edged with wood brown, upper tail-coverts black barred with white; tail black, tipped rather narrowly with dark drab and crossed by two rather wide white bars and an indication of a third that does not

reach the shaft on individual feathers; scapulars color of the back, strongly barred with white for about two-thirds of their length, basally; primaries dull black on the outer web and tip, white on the inner web as far as the emargination on the outer feathers, but not reaching the shaft except at the base, the black increasing in area from the outer feathers inward and turning to dark brown at the base and tip, leaving a large subterminal black band, a small black spot appearing on the inner web on the edge of the white of the second outer feather, increasing in number and intensity inwards on the other primaries, where they become interrupted bars not reaching entirely across the white to the inner web, however; secondaries and tertials grayish brown with a dull black subterminal band, the inner webs of the outer and the inner webs and bases of the inner feathers white, barred with dark brown; wing-coverts grayish brown; primary coverts dull blackish brown, irregularly barred with white on basal two-thirds of inner webs, the white extending to only webs at extreme base; lining of wing cream buff; sparsely spotted with small cinnamon spots; axillaries creamy white, with rather narrow bars of mars brown along the shaft; chin and throat white, with narrow dark brownish streakings; rest of underparts white, barred spotted or streaked comparatively lightly with mars brown, the streakings barring heavier on the chest, decreasing on the abdomen, and ceasing entirely on the under tail-coverts; thighs narrowly barred with mars brown.

Wing (8.94) 227; tail (5.63) 143; culmen, from cere (.71) 18; tarsus, (2.20) 56; middle toe, (1.10) 28.5 mm. J. H. Riley, Auk, XXV, July, 1908, pp. 273-274.

Synonymy.

Wilson being the first to properly figure and describe this species, in 1812 bestowed upon it the name of *Falco pennsylvanicus* (Penn's Woods Falcon); but as he had previously so-named his Slate-colored Hawk, an immature *Accipiter velox*, and did not live to correct his error, it of course resulted

in confusion. In 1824 Bonaparte proposed *F. Wilsonii* (in honor of Alexander Wilson), but immediately announced in a footnote that Ord, who was Wilson's editor and immediate successor, had informed him of his intention to substitute *F. latissimus* (broadest) for *F. pennsylvanicus* in the 1824 reprint of Wilson's American Ornithology; and which was done accordingly. Bonaparte did not formally withdraw his own appellation, but merely added that Ord's name must be adopted, if not pre-occupied. Indeed, Ord had already made use of this name in a list appearing in Guthries' Geography, 1815, but unfortunately neglected to add description or refer to Wilson's figure or description. In the 1828 edition of Wilson, Ord is made the authority for the statement that he was responsible for the change in the reprint, and the declaration that should *F. pennsylvanicus* Slate-colored Hawk and *F. velox* Sharp-shinned Hawk prove to be the same species, the former name should be retained for the Broad-winged Hawk and *F. velox* for the Slate-colored or Sharp-shinned Hawk. In 1829, Griffith and Pidgeon, and in 1840, Brewer, quoted *F. latissimus* Ord; demonstrating the fact that no confusion existed at the time over the authority of the name. Audubon found the Slate-colored and Sharp-shinned Hawks identical, immature and adult in different plumages; and *velox* being the first named as well as the adult, that name was retained; and *pennsylvanicus* now a synonym, fell in disuse in this instance, but was revived and came into general use for the Broad-winged Hawk. However, trusting to the failing memory of the aged Ord, Cassin in 1854 stated that Wilson himself had corrected the name to *latissimus* in the later copies of the original edition. The very existence of the reprint of 1824, which retained the original date, was forgotten; and when Sharp revived *Buteo latissimus* in 1874 in accordance with Cassin's erroneous conclusions, the editors of the *Ibis* protested against the change, based as it was upon strained application of the laws of priority, after remaining practically unchallenged for over sixty years; yet the law "once a synonym always a synonym" relegated *pennsylvanicus*

icus to the ornithological limbo, and *latissimus* came to its own only to give way at last to the long ignored *platypterus* of Vieillot, in 1901, when Faxon reasserted Ord's editorship and the existence of the 1824 edition or reprint of Wilson's American Ornithology; and as he states, both Ord's and Bonaparte's names are anticipated by the *Sparvius platypterus* of Vieillot, 1823! Riley and Richmond burrowing through musty volumes of ancient ornithological lore, have recently discovered in the *Falco fuscus* of Miller, 1777, an immature *Buteo*, probably *B. platypterus*; considered a fairly good representation for an old plate, "though the tail is too fulvous and the dark brown subterminal band is much too narrow." Here again, the Broad-wing and the Sharp-shin clash, for until recently, *fuscus*, based primarily upon this drawing, was the generally accepted specific name for this *Accipiter*.

"? *Falco fuscus* Miller, Various Subjects Nat. Hist., Pt. 3, 1777, pl. 18.—Shaw, Cimelia Physica, 1796, 35, pl. 18. ?[*Falco*] *fuscus* Gmelin, Syst. Nat., I, i, 1788, 280 (based on Miller pl. 18; not of Gmelin 271). Latham, Index Ornith., I, 1790, 43, No. 103 (same basis). ? *F[alco] cincrascens* Bechstein, Lathan's allgemeine, Uebersicht der Vogel, IV, 1811, 36 (based on Lathan, Index, I, 43, No. 103)."

Wilson suggests, Am. Orn. IV, 1812 92; and Coues, Cent. Dict. I, 1891, 743; considers the probability of the Buzzardet *Falco albidus* Pennant Arctic Zool., II, 1785, N. 109; being identical with this species.

Buteo platypterus platypterus (Vieillot).

Falco pennsylvanicus Wilson, Am. Orn., VI, 1812, p. 92, pl. 54, fig. 1 (type in coll. Philadelphia Acad. Nat. Sci.; not of Wilson *t. c.* 13, pl. 46, f. 1).—Latham, Gen. Hist. Bds., I, 1821, 263.—Bonaparte, Sp. Comp. D. Orn., 1827, 19; Ann. Lyc. Nat. Hist. N. Y., II, 1828, 29; Oken's Isis, XXV, 1832, 1137.—Audubon, Bds. Am. I, 1828, pl. XCI; Orn. Biog., I, 1832, 461; *Ibid.* V, 1839, 377.—Jardine, Wilson's Am. Orn., II, 1832, 298.—Nuttall, Manuel, I, 1832, 105.—Temminck, Index de cseaux, 6, 1836, 5; Nouv. Reg., I, 1837.—Magiet, Cat. Magn., 1846, 2.—Chartrouse, Cat. de Ois., 1856, 5.—Holmes, Rep. Conn. Patents, 1856, Agri. (1857), 113.—Samuels, Bds. N. Eng., 1870, 40; Our N. and E. Bds., 1883, 40.

Falco pennsylvanicus Bonaparte, Cat. Bds. U. S. 1827, 10.

[*Falco*] *pennsylvanicus* Michener, Hist. Chester Co., Pa., 1881, 441.

Falco Pennsylvanicus Swainson and Richardson, Fauna-Borealis, II, 1831, 66.—Jameson, Wilson's Am. Orn., I, 1831, 65.—Baker, Am. Orn. Index, 1835, 10.—Kirtland, Rep. Ohio Geog. Sur., 1838, 161, 178.—Brewer, Syn. Bds., 1840, 684.

F[alco] Pennsylvanicus Griffith and Pidgeon, Class Aves, 1829.—Griffeth, Animal Kingdom, VI, 1829, 49.—Linsley, Am. Jour. Sci and Arts, XLIV, 1843, 252.

S[parvus] platypterus Vieillot, Ency. Meth., III, 1823, 1273.

F[alco] Wilsonii Bonaparte, Jour. Acad. Nat. Sci. Phila., III, Apr. 1824, 348.

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F[alco] latissimus Ord, N. A. Zool., 1815, 315; Wilson's Am. Orn., II, 1828, 92 (footnote).—Bonaparte, Jour. Acad. Nat. Sci. Phila., III, 1824, 348 (footnote).

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Buteo Pennsylvanicus Bonaparte, Geog. and Comp. List, 1838, 3.—Gray, List Spec. Bds. Coll. British Mus., I, 1844, 16.

—Brewer, Syn. N. A. Bds., 1840, 684; Trans. Boston Soc. Nat. Hist., VII, 1860, 306.—Read, Proc. Acad. Nat. Sci. Phila., VI, 1854, 396, Hincks, Canad. Jour. Ind., Sci. and Art, IV, 1859, 445.—Goodrich, Ill. Nat. Hist., II, 1861, 31.—Schlegel, Mus. D' Hist. Nat., II, 1862, 20.—Samuels, Rep. Conn. Agri., 1864 (1865), 390.—Turnbull, Bds. E. Pa. and N. J., 1869, 7.—Maynard, Trans. Boston Soc. Nat. Hist., XIV, 1872, 382; Bds. E. N. Am., 1881, 315.—Wheaton, Am. Rep. Ohio State Bd. Agri., 1874, 570.—Snow, Cat. Bds. Kas., 3rd ed., 1875, 10.—Venner, Our Bds. Prey, 1876, 61.—Merriam, Trans. Conn. Acad., IV, 1877, 87.—Ridgway, Proc. U. S. Nat. Mus., III, 1880 (1881), 71.—Wintle, Orn. Isl. Montreal, II, 1882, 117.—Morden and Saunders, Can. Sports and Nat. II, 1882, 192.—King, Wis. Geo. Sur., 1883, 587.—Maynard, Naturalist's Guide, 1883, 137.—James, Cat. Cincinnati Soc. Nat. Hist., IX, 1886-87, 60.

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B[uteo] Pensylvanicus Ridgway, Ann. Lyc. Nat. Hist. N. Y., X, 1874, 381.

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Vernacular Names.

Broad-winged Hawk. "Its great breadth of wing, or width of the secondaries, and also of its head and body, when compared with its length, struck me as peculiarities," (Wilson).

Broad-winged Buzzard, (Coues).

Broad-winged Falcon, (Latham).

Broad-wing, (Of many writers).

Broad-winged Hawk, (Vieillot).

Broad-billed, Brown-winged and Road-winged Hawk—doubtless typographical errors (minor oological periodicals).

Chicken Hawk. In common with the Marsh, Red-tailed, Red-shouldered, Rough-legged and Cooper's Hawks. (Coues, and Prentiss, Surface, Widmann, and others).

Falcon de Monte, Cuba, (Brewer).

Gahilian, Minea, Sierra Nevada of Santa Marta, Venezuela, (Slavin and Godman).

Hen Hawk, Hohawk Valley, N. Y. (Willard); Maryland; The three *Buteos*, (Kirkwood); Massachusetts, (Maynard).

Halcon pinto, Mexico, (Ferrari-Perez).

L'Autour de Pennsylvania, Canada, (Le Moine).

La Buse de Pennsylvania, Quebec, (Dionne).

Pennsylvanian Buzzard, (Sharp).

Buteo platypterus antillarum.

Antillean Chicken Hawk, St. Vincent, (Clark).

Broad-winged Hawk, (Of earlier writers).

Chicken Hawk, St. Vincent. "The name by which this bird is

known throughout the island led me to suppose that it was an enemy to chickens. I never observed it molesting the poultry," (Lister); St. Vincent, (Ober); Grenada, (Wells).

Gree gree, Grenada, (Wells).

Buteo platypterus rivierei.

Broad-winged Hawk. This is a book name never used by the people in general, though very appropriate and sanctioned by almost a century's usage in literature.

Mal fini, St. Marie, Indian Country, Dominica. "This bird courses above the valley, uttering its cry of 'Mal fini, fini,'" (Ober).

Malfeenee, Dominica, (Verrill).

Rivieri's Hawk, Dominica. In honor of Dr. Rivieri (Verrill).

Geographical Distribution.

The summer range of *Buteo platypterus platypterus* extends from Cape Breton Island to central Alberta (northernmost records—Moose Factory, southern extremity of Hudson bay, Ontario; and 12 miles west of Ste. Anne, Alberta); south to Florida and central Texas. The western limits correspond substantially to the western limits of the humid province in the United States. Resident in Cuba and Porto Rico. Local throughout its range. Reported more or less abundant as a breeder in northwestern Florida, Adirondack mountains, Connecticut valley, Umbagog lake region, New Brunswick, interior of Quebec, Muskoka and Parry Sound districts of Ontario, wooded districts of Manitoba and Minnesota. Replaced in the West Indies (except Cuba and ? Porto Rico) by *B. p. insulicola* in Antigua, *B. p. rivierei* in Dominica, and *B. p. antillarum* in Martinique, Santa Lucia, St. Vincent, Bequia, Mustique, Cannouan, Carriacou, Grenada, and ? Tobago, where it is resident. Extinct in the Barbadoes. The winter range extends from southern New Jersey, Maryland, West Virginia, southern Ohio, Indiana, and Illinois, southward through Mexico, Central America and western South America to Peru and the head waters of the Amazon river. Rather uncommon in the United States during the winter months. Rare straggler north to Connecticut and Massachusetts.

LOCAL DISTRIBUTION.

CAPE BRETON ISLAND.—One seen (Townsend); not uncom.—Townsend (Macoun); Macoun has evidently misquoted. I have looked up my notes on the subject and find that I saw the bird at Ingonish on Aug. 29, '05; and from my notes and my memory of the case I think the diagnosis was correct (Townsend *ms.*).

NOVA SCOTIA.—Very rare, two doubtful records, one obtained in the market Sept., '88, and another supposed to have been shot at Stewiacke (Downs). Rare S. R. according to H. F. Tufts (Macoun).

I took an immature male at Sherbrooke, Guysboro Co., in Aug. '03, the only definite data, although in Kings and Annapolis Cos., at different times, I have seen hawks that I identified as the Broad-winged (Tufts *ms.*).

NEW BRUNSWICK.—Given by Boardman in 1903 as abundant, and by Macoun, same year, as a rather rare S. R. About the Islands of the Bay of Fundy, S. V., com., breeds (Boardman). Occurs in St. John and King Cos., Dr. Adams states that the Red-tailed and Broad-winged are the most abundant Hawks in the interior (Chamberlain). St. John's, breeding (Banks, Davie). Victoria Co., Grand Falls, not com. (Batchelder).

QUEBEC.—Saguenay Dist., Godbout, very com., some years very abund. migrant and apparently does not nest much along our coast line, but seems to direct itself much further north (Comeau *ms.*). Temiscouata Co., Trois Pistoles, one capture in five years' study, an immature, about Oct. 5, '06 (Le Chasseur *ms.*). Stanstead Co., Coaticook [Coaticook], Mr. Woodward sent up a female, lately doubtless nests in the Province (Couper). Montreal, not com. (Wintle); mention (Shaw); S. R., com., more plentiful during the migratory period (Wintle). Quebec, Mr. John Neilson considers it com. near the city (Chamberlain). Labelle Co., Inlet.—50 m. N. E. Ottawa—single individual Apr. 25, 27 and 28, '05 (Elfreg *ms.*).

ONTARIO.—In 1886 McIlwraith gives it as very com. in spring in southern part, a few remain to breed, but the greater number pass on N. W., and in the western part Morden and Saunders find it sometimes com. in flocks during migrations, at other times single individuals are rather rare. In 1890, a very rare S. R. according to Thompson. In the southern part one of the commonest hawks (Fleming). Macoun states that it is increasingly com. as we go west in the valley of the St. Lawrence and found all over Ontario. He also quotes Rev. C. J. Young, under the head of the Red-shouldered Hawk, that this bird becomes rare in eastern Ont., 15 to 20 miles north of the St. Lawrence, and 50 miles back it is almost unknown, its place seemingly taken by the Broad-wing. Rev.

Young gives but a single record of its nest—May 24, '99, though the immatures are com. near the St. Lawrence in Sept. and Oct. Nash gives it as S. R., breeds throughout. Wm. L. Scott thinks it is the commonest hawk in the Ottawa valley (Chamberlain). Prescott Co., specimen (Worthen ms.). Carleton Co., Ottawa, S. R., com., breeds (Kingston, Lees and Macoun); a regular S. R. (White ms.). It seems to be decreasing, have not met with it as often as formerly. A male that came to my hands May 8, '09, was probably one of a pair breeding (Eifrig ms.). It is the commonest hawk in the county of Renfrees, near the Ottawa river, and is also com. in the county of Lanark (Macoun). York Co., Toronto, according to Mr. Passmore a considerable number of both young and adults were met with (Venner). Ernest Seton in ms. list of Toronto birds, written in '85, gives it as "com., breeds," but I have not heard of any breeding records, and in my Toronto list I give it as a regular migrant. I have seen few mature birds from Toronto, while immatures are often abundant (Fleming ms.). Holton Co., scarce migrant (Brooks); Glenwilliams, Esquesing Twp., May 4, '10, about a dozen observed on the wing, all in adult plumage (Fleming ms.). Wellington, O., Gueph, spring and fall visitant, frequent (Klugh, Sweet). Wentworth Co., Hamilton, extensive migrations in March, those met with in the woods appeared to be stragglers from the main body (McIlwraith). Elgin Co., large flocks in fall sometimes, but this is the only time I have observed them (Farley); found breeding (Anderson). Middlesex Co., London, reported (Venner, McIlwraith, Fisher). Essex Co., Point Pelee, fall transient, not more than a dozen seen at any one time, no spring records (Taverner and Swales); Grassy Island, have been unusually abund. (Swales). Muskoka and Parry Sound Dist., com., a large number breed (Fleming, Macoun). Breeds commonly in Muskoka, 36 m. back from Georgian bay, and its squeaky cry can be heard any time of the day throughout the summer (Taverner ms.).

Lake Muskoka, one seen on the mainland, the other at Gibralter. This is, however, the most abundant hawk here (Taverner and Swales); Emsdale, breeding (Fleming, Macoun). I think the breeding range is possibly north to the height of land and south to Muskoka. I have always found it well distributed over the country in both Muskoka and Parry Sound, in the breeding season, but have only twice found its nest (Fleming ms.). Annina, Nepis-sing, near Latchford, a pair of juveniles almost fledged, taken from nest (Fleming ms.). Lake Restoule, com. in Aug. (Eaton). Algonquin Park, quite com., breeds (Burtch ms.). Algoma Co., Moose Factory, a specimen taken in 1862 by James McKensie

(Turner); male (Ridgway); June, '96, Spreadborough found it common on Moose river, but none were seen north of Moose Factory. This may be considered its northern limit (Macoun). Southern extremity of Hudson bay (Blakiston).

MANITOBA.—Reported from various parts of the Province, where well timbered, and is generally distributed, though not abundant (Seton); abound everywhere (Brodie); very rare S. V. on the Big plain. More com., and probably breeding in Red river valley (Seton). Fort Garry, Selkirk settlement (Ridgway). Winnipeg, S. R., rare breeder (Thompson); extends westward to Winnipeg, where it breeds (Macoun); abundant as well as Swainson's (St. Croix); Carberry, doubtful record (Thompson); Carman, breeding (Forge); Woodland, set of eggs taken by W. Raine (Macoun), and by C. F. Forge (Sharples *col.*); Ravenwood, sets of eggs collected by Forge (Price *col.*, Jacobs *col.*). Hyde Park Dist., Duffryn Co., sets of eggs collected by Forge (Jacobs, Jackson and Sharples *cols.*). Portage la Prairie, regular and common breeder in the wooded districts. My first record was on May 1, 1897, when I collected a male, within the week I received a female—both of which I mounted. In May, 1900, between the 12th and 22nd, I took a trip on the Assinaboine river to Winnipeg and noted it regularly all the way down, and on the 16th a nest was found but it contained no eggs (Atkinson *ms.*).

SASKATCHEWAN.—I think that doubtless it will be found in the Alleghenian region of the Manitoba and Saskatchewan, that is reaching the Saskatchewan river on its easterly half. I cannot at present lay my hands on any records west of Manitoba (Seton *ms.*).

ALBERTA.—Apparently a regular summer inhabitant of the southern part of the Athabasca region. On May 8, '03, we saw one in the wooded valley of the Saskatchewan near Edmonton. It was in suspicious proximity to an old nest and possibly intended to reoccupy it. Alfred E. Preble and Merritt Cary saw one on the Athabasca a few miles above Athabasca Landing on Sept. 5 of the same year. J. Alden Loring found a nest containing two eggs on Jasper House trail, 12 m. west of Ste. Anne, Alberta, May 27, '96. The female was shot as she left the nest and is now in the collection of the Biographical Survey (Preble), 30 miles N. W. of Edmonton, 114° W. long., and $53\frac{1}{2}^{\circ}$ N. lat. Fairly common, breeding preferably in low birch trees (Stansell).

MAINE.—Uncom. S. R. (Allen). Aroostook Co.; breeding at Houlton (Batchelder), not rare S. R. (Knight); Washington Co., Calais, Com. S. R., breeds (Boardman); Milltown, young birds scarcely fledged (Ridgway); Grand Lake stream, present in June, and also at Alexander, where a set of eggs was collected (Carpen-

ter *ms.*). Hancock Co., quite generally found as a S. R. (Knight). Penobscot Co., breeds quite generally, not quite so commonly of late years as formally (Knight); Holden, May 21, '88, set of eggs taken by Manly Hardy (Bendire). Orono, Apr. 11, '96 (Sweet).

Piscataquis Co., Moosehead Lake, one shot in July (Storer); com., breeds, according to Homer (Knight). Somerset Co., Dead river region, several individuals were seen in the vicinity of Flagstaff, and a specimen secured. I have seen the species on every visit excepting winter (Carpenter); Orland, Alamoosooak lake, present (Merrell); Skowhegan, spring date (Swain); Pittsfield, two sets of eggs collected by Clarence H. Merrell (Crandall *coll.*). Franklin Co., Rangeley Lakes, June dates (Childs); Avon, spring and fall dates (Sweet); Kingsfield, Jerusalem Plantation and base of Mt. Abraham, sets of eggs, 1894-95 (Carpenter *ms.*); New Vineyard, set of eggs by J. L. Colcord, '05 (Carpenter *ms.*); Farmington, spring dates (Sweet). Oxford Co., com. S. R. (Maynard); Umbagog Lakes, abund., apparently the most com. hawk (Verrill); Norway, S. V., breeds (Verrill); breeds commonly according to Nash (Knight); fall date (Johnson); Hebron, May 20, '06 and May 21, '08, and Buckfield, May 5, '96 (Sweet). Waldo Co., not rare S. R. (Knight); Lincoln, 3 sets of eggs, 1899 and 1900 by W. J. Clayton (Crandall, and Dille *coll.*). Knox Co., migrant acc. to Rockliff (Knight). Kennebec Co., Waterville, found previous to 1865 (Hamlin) and at present time by Royal (Knight); spring date '02, Swain (Sweet). Sagadahoc Co., com., spring and fall, acc. Spinney (Knight). Androscoggin Co., fairly com. S. R., acc. to Johnson (Knight); Livermore, June 9, '97 (Briggs); Lewiston, Sept. 8, '02 (Sweet). Cumberland Co., com. S. R. acc. to Mead (Knight); Portland, uncom. S. R. (Brown); Freeport and Portland, spring and fall dates (Brownson); Brunswick, Apr. 8, '09 (Sweet). York Co., Adams (Knight).

NEW HAMPSHIRE.—Breeds (Samuels); uncom. migrant and S. R. (Allen); com., breeds (Childs); fairly com. S. R. of the densely mixed woods of the sub-Canadian area. In the White mts. region and northward, it is the commonest breeding hawk, but with central and southern N. H. it is less com., except along the ridge of the western part (G. M. Allen). Coos Co., com. S. V. (Maynard, Clark); Mt. Washington, 8 sets of eggs, '90 (Clark); Lancaster and Jefferson, by far the most com. hawk, probably outnumbering all other species put together, though the cutting off of the old growth trees is forcing it further back, as I have never found it nesting in second growth timber (Spaulding *ms.*); Chickora, White mts., breeding (Bowles); Monadnock, not uncom. acc. to Gerald Thayer (G. M. Allen). Carroll Co., North Conway, breeding, '89

(Nash); Intervale, nest and eggs (G. M. Allen). Grafton Co., not uncom., (Sherman); West of Newfound Lake, where it breeds up to the limit of large tree growth, about 2500 ft., S. R., rare (G. M. Allen). Belknap Co., Alton, two records, May and Aug (Dearborn). Merrimac Co., Webster and adjoining twps., rare only a few seen (Goodhue). Hillsborough Co., Milford, set of eggs (Tilton); Amoskeag, considered irregular visitor until '92, when about 4 pairs undoubtedly nested (Farmer); Millis, set of eggs May 18, '06, by S. P. Willard (Rawson); our rarest hawk (B. G. Willard *ms.*); Hollis, Dr. W. H. Fox found nest and eggs years ago (G. M. Allen); Hudson, female, May 25, '83, by F. F. Jenks (Phil. Acad. Nat. Sci. coll.).

VERMONT.—Not uncom., but seen now and then, breeds (Cutting); not uncom. (Howe); not com. S. R. (Perkins and Howe); uncom. S. R. (Allen). Essex Co., Lunenburgh, com. breeder (Spaulding *ms.*). Chittenden Co., Burlington, female shot while building nest in Apr., '40 (Thompson). Washington Co., Montpelier, one taken in summer, early '70s (Briggs). Addison Co., Middlebury, Prof. Adams found nest some years since (Brewer). Rutland Co., migrant, rare (Ross); Middleton Springs, not at all com., except during a flight in the fall of '04 (Hickox *ms.*). Windham Co., rare S. R. (Davenport); Londonderry, one observed several times in summer of '95 (Allen), Bennington Co., rare S. R., found most frequently in autumn along wooded streams (Davenport); Bennington, seen June 30, '09 (Ross).

MASSACHUSETTS.—Quite rare (Samuels); to be seen during summer and occasionally winter, but more com. as a migrant (Minot); rather rare S. R. (Allen); rare S. R. and not uncom. spring and autumn migrant (Howe, Allen); uncom. migrant and rare S. R. in remote districts (Allen). Eastern, not very com., perhaps breeds, I have not seen it in winter (Maynard). Essex Co., winter, rare (Putnam); not uncom. T. V., very rare S. R. Boxford and Georgetown, breeding; Chebacco Lake, July dates (Townsend); set of eggs coll. by Walter C. Jones (Flanagan *ms.*). Middlesex Co., Newton, nest and eggs, '63, and Tyngsburgh, present (Maynard); Farmingham, set of eggs (Norris); Weston, Natick and Concord, spring dates (Peters); Cambridge, T. V., sometimes com. in Sept., rare in spring acc. to Brewster (Chapman). Suffolk Co., during the migrations by no means com. about Boston (Brewster). Norfolk Co., West Roxbury, nest May 20, '64 (Samuels); Brookline (Ridgway); single egg May, '61, by Richie (Bendire); migrant (Howe); Sharon, set eggs May 30 '96, at the time very rare (Bowles *ms.*); Ponkapog, sets of eggs May 18 and 31, '92, and May 21, '04 (2); two yg. females shot near residence in early July, '10,

undoubtedly hatched in pine grove nearby (McKechnie *ms.*). Greylock, June 13, '08, and June 19, '10 (Bridges); Bristol Co., very rare, breeds (Andros); comparatively scarce, I have only met with it from early May to late summer, perhaps half a dozen nests—the bird is gradually increasing in numbers (Durfee *ms.*); Acushnet, instance of capture by Brown, Apr. 12, '82 (Read). During the early years of my collecting, say 10 or 15 years prior to '97, I never even heard of it in this region, though I spent much in the field and was fairly successful in finding all the other common species of hawks and made a specialty of the Raptore. I cannot help thinking that it was much less common than now. It was not until I met Rev. H. K. Job, then living in N. Middleboro, that I began to realize that it was a regular breeder. He showed me two localities where he had taken the eggs in '95, '96 and '97. Mr. Owen Durfee of Fall River also found a nest in the hardwood timber west of Taunton. On May 30, '99, I found my first nest. This was shown me by a young man who claimed to have found a number, and said he considered the species fairly common. Sets were taken in the same locality, near Taunton, in '00 and '01, from the same pair presumably. My experience during the past 10 years in Bristol and Plymouth counties has taught me that it, though hardly common, is by no means rare. As compared with the Red-shouldered, which is our commonest *Buteo*, I should say that there were at least six pairs of the latter to one pair of the Broad-winged. In the region that we hunt most thoroughly in the western half of Bristol Co., comprising an area approximating 10 miles square, we count on locating from 25 to 30 pairs of Red-shoulders, whereas we can hardly expect to find over 4 or 5 pairs of Broad-wings (Bent *ms.*). From '81 up to 1900 I spent fully as much time each season afield here in Bristol and Plymouth Cos. as I have since, but not until May 27, 1900, did I ever find a nest, and only one shot in 1892—and but two surely identified birds seen previous to that; since then it has established itself locally, so much as to be recorded as fairly common (Carpenter *ms.*).

Plymouth Co.: Carver, three sets of eggs (Bent *ms.*); Fairly com. S. R. (Carpenter *ms.*); East Whitman? male, Feb. 29, '92 (C. C. F.). Barnstable Co., Wood's Hole, one noted July 4, '04 (Jones). Worcester Co.: breeds rather commonly (Brewster); nesting (Reed); Lancaster, our commonest hawk with the exception of *Buteo lineatus*. I have found a great many nests that I have left unmolested (Thayer *ms.*). Hampshire Co.: tol. com. S. R. in Connecticut valley (Colburn and Morris); Amherst and nearly the whole county, recorded at Leverett and Pelham (Clark); Monson, set of eggs col. by Milton C. Howe (Crandall *col.*). Hampden

Co.; Springfield (Stearns and Coues); quite rare, breeds (Allen). Breeds regularly and commonly in the mountains west of Westfield, rare in the river town[ships] during the spring and autumn (Morris). Berkshire Co. Rare S. R., found breeding by Mr. Archibald Hopkins, near Williamstown, identified by Mr. Brewer. Mr. R. T. Fisher found a pair nesting near the Cheshire reservoir. Specimen killed in Dalton, Apr. 2, '98. From advice received we believe that this hawk is a tol. com. S. R. on the eastern slope of the Green mts. in adjoining counties of Hampshire and Hampden (Faxon and Hoffman).

RHODE ISLAND.—Large flights in certain sections (Dunn); an uncom. migrant and rare S. R. (Howe, Allen). It is of very local distribution and I am not aware of it nesting east of the Narragansett bay and the Providence river. The most northern breeding record is Gloucester, Providence Co., and the most southern at Wakefield, Washington Co., May 10, '03, nest completed but not revisited. The woods in the western part of the state have been cut in recent years, greatly reducing favorable localities for all of the hawks to nest in. If any one was to ask me to find a nest this year I do not think I could do it, with the possible exception of South Kingston, where I found a nest but no eggs some 4 or 5 years ago. There is a probability of one or two pairs in the neck of woods in the northern part of the state, however. At Charlestown, in the open woods just north of Quawchontang pond, I saw a young bird Aug. 4, '06. A nest with two young just hatched and an egg which was pipped, was found June 19, '07, by Walter A. Angell in West Greenwich. On June 9, '10, I saw two birds in open woods near Summit (Hathaway *ms.*). My experience has been that Broad-wings do not return to the same locality year after year. In only one instance have I found a nest in the same grove in two successive years. The four nests taken in '06 were all within an area of two square miles, yet not a single pair returned to this locality in '07 (Flanagan *ms.*). Records of the collection of sets of eggs: Providence Co., May 27, '05, by F. and J. Flanagan; Gloucester, May 13, '00, by Wm. A. Sprague; May 19, '02, by Walter A. Angell; Cranston, May 11, '00, and May 24, '01, by H. S. Hathaway; Smithfield, June 2, '04, by W. A. Angell, who shot the female; Kent Co., May 19, '04, by J. H. Flanagan and C. H. Remington; May 26, '00, May 26, '01 (2), May 13, 19 and 27 (2), '06, by T. and J. Flanagan; Washington Co., East Greenwich, occupied nests found May 13, '00, and June 9, '01, by F. E. Newberry; Kingston, by Prof. Geo. Field, while at the Agricultural Experimental Station, eggs since destroyed and no date kept (Hathaway *ms.*). (Merriam); found breeding (Wood); S. R., but breeds sparingly;

CONNECTICUT.—Rather rare resident, seldom seen in winter very regular and abundant in flights from the middle to the last of Sept. (Trowbridge); uncom. migrant and rare S. R. (Allen); Western Conn., not our commonest hawk by any means. Found nesting along the mountain streams (Job), Southern Conn., com. (Job); New London Co., Norwich, two sets of eggs, '84 (Rawson); regular S. R., breeds, formerly rare, 6 sets taken by Thos. B. Trumbull and Lorenzo Blackstone, '95-'99, Chauncey Brand showing the former his first nest (Richards *ms.*); Middlesex Co., 3 sets of eggs between '99-'03 (Beers *ms.*); Portland, Mr. W. W. Coe has taken quite a number of its nests, together with several of the finest birds I have ever seen (Merriam); present (Sage); Middle Haddam, breeding (Case); specimen (Fisher); Chester, sets by C. H. Watrous and H. Bennett (Beers coll.), and by J. B. Canfield (Crandall *col.*); New Haven Co., it breeds sparingly about New Haven (Merriam); a very rare bird (Linsley); 2 sets, 1906 (Beers *ms.*) fall migrant (Trowbridge); Seymour, 2 sets '06 by A. A. Lockwood (Beers *ms.*); Northford, set taken by A. M. Linsley (Lattin); Northfield Co., 3 sets June 8, '04 (Beers *ms.*); Torrington, several sets coll. by John Gath (Jacobs, and Price *coll.*); Winchester, 7 sets, '86-'96, 3 sets in one day, by Chas. H. Williams (Crandall *coll.*); Fairfield Co., com. breeder (Hamlin *ms.*); an uncom. resident (Wright); 23 sets of eggs '96-'06 (Beers *ms.*); Bridgeport, resident [?], sometimes com. in migration (Verrill); Bethel, 12 sets coll. by Geo. L. Hamlin, '86-'96 (Jackson *coll.*); Monroe, set May 24, '98, by H. W. Beers (Crandall *coll.*); Fairfield, set May 15, '99, by Beers (Sharples *coll.*); Stratford, female taken, spring of '41, compared with spec. in Peale's museum, New York, and identified by Audubon (Lindsley).

NEW YORK.—Rare (DeKay); not com. permanent resident (Chapman). Hudson Highlands, our most abundant hawk, a permanent resident, but only occasional in winter, breeds (Mearns). Mohawk Valley, it is doubtful if in any one district it is to be found in greater numbers (Willard). Adirondack Region, rather com. S. R., breeding about the lakes (Merriam). Western Adirondack Region, present (Hall). Western N. Y., S. R., breeds, not always as com. as *B. borealis* and *lineatus* (Short, Eaton); rather rare S. R., breeds (Reineck), Long Island, exceedingly rare (Giraud); Bay Ridge, fall migrant (Townsend); Long Island City, 3 spec. Sept. 23 and 24, '87 (Fisher); Orient Point, one seen Dec. 25, '05 (Latham); College Point, one Dec. 29, '97, (Abbott and Harper). Franklin Co., one shot Aug. 24, '74, (Roosevelt and Minot); Saranac Lake, one spec. (Baird). Clinton Co., Upper Chateaugay Lake, Sept. (Howe). Warren Co., Lake George, Aug. 2 (Fisher). Ham-

ilton, Herkimer, and Oneida Cos., found in considerable numbers by Dr. Ralph (Bendire). Herkimer Co., Wilmurt, breeding acc. to Ralph (Bendire). Oswego Co., Oswego, regular breeder (Stone); the Broad-winged and Red-tailed Hawks used to be here in goodly numbers, but I have seen only a single one in years (D. D. Stone *ms.*); set col: by L. C. Snyder (Short *ms.*). Saratoga Co., Outlet creek, Balston Spa, set of eggs (B. A. G.). Fulton Co., Mountain Lake, rather rare, one seen Aug. 26, '07; I have seen many specimens in E. P. Hotaling's taxidermist shop at Gloversville (Alexander *ms.*). Oneida Co., not com., breeds (Ralph and Bagg); Utica, two eggs (Willard); generally distributed, nowhere com., breeds (Trembly); found nesting in '73, and later at Mud creek (Davis); one of our rare hawks, have collected but two sets. I have just finished rewriting my List of Oneida County Birds and will give this species as "A com. S. R. in West Canada Creek Valley. Not com. elsewhere. Breeds. Several nests on record in the town[ship] of New Hartford." Dr. Langworthy's, Trembley's, Davis', and my own nests were all taken in that town[ship]. I have spent at least part of every year for the past 35 years in West Canada Creek Valley and am disposed to consider it the commonest hawk. Here in Utica, I think I would place the hawks as follows as to abundance: Red-shouldered, Red-tailed, Sparrow, Sharp-shinned, Broad-winged. Others follow. I do not think it is a very rare breeder with us, but the two larger hawks are so much more common that this bird is considered rare by comparison (Bagg *ms.*). Rensselaer Co., Troy, Sept. specimens (Fisher); Stephentown, tol. com., four nesting places within five miles (Hoag). West Chester Co., one May 8, '04, F. C. Hubel (Jones); breeding (Burroughs); Sing Sing, tol. com. acc. to Fisher (Chapman). Orange Co., Highland Falls, Apr., May, and Aug. Specimens (Fisher). Rockland Co., Mr. Bell informs me that he killed several in one day (DeKay); specimen Aug. 17 (Fisher). Ulster Co., near Ellenville and Lake Minnewaska, large flights in Sept. (Barbour); Valley of Navesink river, pair July 27-Aug. 5, '98 (Bent *ms.*). Madison Co., S. R. (Embody). Cayuga, Onondago, Seneca, Wayne and Yates Cos., rare S. R., breeds (Rathbun). Onondago Co., Syracuse, spring specimens (Fisher). Cayuga Co., Auburn, rarest of all the family that breed here, I found one set only (Wilson); nest May 18, '83, not very com., but was regularly met with (Rathbun *ms.*). Cortland Co., rare (M. D. M., Jr.). Tompkins Co., Ithaca, one shot Aug. 25, '98, by Mr. W. C. Thro (Hankinson *ms.*). Cayuga Lake Basin, transient (Reed and Wright); Chemung Co., I have not been able to obtain a specimen, altho' I have no doubt it will be found here (Gregg); Elmira, June

27, '85; Apr. 9, '86; July 23, '87 (Swift); specimens in spring and summer (Fisher). Yates Co., rare, one Sept. 10, '75 (Gilbert); Branchport, does not occur, have not seen one in 20 years' study (Burtsch *ms.*). Monroe Co., Rochester, abundant migrant, does not breed (Eaton). Orleans Co., taken by Fred Lusk (Posson). Niagara Co., rare, I do not know that it breeds (Davidson); Lockport, spring date (Fisher). Erie Co., Buffalo, rare straggler (Bergtold). Probably breeds (Reineck). Chautauqua Co., rare (Edson). Medina and Albion, Orleans Co.; Lockport, Niagara Co.; Naples, Ontario Co.; Rochester and Brockport, Monroe Co.; Erie, Cattaraugus, and Genesee Cos., S. R., breeds (Short).

NEW JERSEY.—Frequently more numerous than supposed to be. Breed every season in the hilly, wooded districts (Abbott); a resident species in the southern part, and S. R. in the north, but nowhere common in the winter and not as abundant as the Red-shouldered Hawk in summer (Stone); occupies certain sections to the exclusion of its congener (Red-shouldered Hawk), the habitats of the two being complimentary (Miller). Pine Barrens, tol. com., no actual record of breeding but individuals are seen during the summer (Stone). John Krider has several times met with nests near Philadelphia (Brewer). Passaic Co., Greenwood Lake, one observed in June, '09 (Baily). Sussex Co., Stag Lake, extensive autumnal migrations, transient (Von Lengerke); Wawayanda Lake, one observed in June, '09 (Baily). Bergen Co., Ridgewood, rare (Hale *ms.*). Essex Co., Montclair, frequent transient, spring and fall (Howland). Union Co., Summit, very rare S. R., (Holmes, Hann). Somerset Co., Plainfield, spring date (Miller). Middlesex Co., South Amboy, fall flights (Muirhead). Monmouth Co., Atlantic Highland and Sandy Hook, autumnal flights (J. P.). Mercer Co., rare, more frequently seen in winter (Abbott). com. S. R. and migrant, breeding (Babson); Feb. 7, Apr.-June, Dec. 9 (Rogers). Camden Co., Haddonfield, May 16, '82, by S. N. Rhoads (Phila. Acad. Nat. Sci. coll.). Burlington Co., Moorestown, I am not certain I ever saw the bird alive here; Anna A. Mickle mounted a female shot at Mount Ephraim, on May 12, '01 (Evans *ms.*). Salem Co., Salem, very rare breeder, rarely seen at any time, I am not certain but that it is a resident the whole year. Three nests; May, '98, May 27, '00, and May 23, '00 (Crispin *ms.*); set May 20, '97, by B. A. Carpenter (Crandall *ms.*). Cape May Co., Wm. B., Crispin thinks a few pairs breed, and Alfred C. Redfield has also met with it in summer. Atlantic Co., Somer's Point, set of eggs, '69 (Jackson *ms.*).

PENNSYLVANIA.—Dr. Trudeau found nest and eggs (Brewer); rare, most frequently seen in winter (Turnbull); uncommonly

scarce, but few individuals being observed during the autumnal and winter months (Gentry); least abund. of all the Buteos, a native and resident (Warren); rather scarce resident (Stone); among the least numerous, S. R., migrating southward (Surface). Sullivan and Wyoming Cos., summer (Stone). Pike Co., dead bird secured from a farmer's barn door, Sept. 9, '02 (Laurent *ms.*); noticed in '05 (Harlow); set of eggs coll. for Rath (Crandall *coll.*); Milford, not com., breeds (Woodruff); Monroe Co., breeding (Davie, Norris); Broadhead's Creek, pair breeding (Weygaundt); Northampton Co., breeding (Davie); two sets coll. for J. Rath (Crandall *coll.*); Blue Mts., two sets (Norris). Bucks Co., frequent (Thomas); Spring Valley, one spec. (Fisher). Montgomery Co., Fatland Ford, first nesting record, May 27, 1812 (Audubon); set of eggs coll. by Dr. W. E. Hughes (Del. Valley Orn. Club data); Lower Merion Twp., set of eggs May 12, '89, by Harry K. Jamison (Crandall *coll.*); Narberth, resident, not abund., apparently breeds (Rotzell); Oaklane, several noticed in Sept. '06 (Harlow). Berks Co., Fleetwood, nest and eggs, '02, '03 and '07, also one nest near Moselem, '07 (Leibelsperger). Philadelphia Co., Gray's Ferry, pair seen, male shot May 6, 1812—the type specimen (Wilson); Germantown, spring spec. (Fisher); Holmesburg, May 17, '08 (Miller); Fox Chase, young male Sept. 8, '08; and Frankfort, lined nest May, '02, one bird about for a time, but female probably shot (Miller *ms.*). Delaware Co., occasional in winter (Cassin); wintering (Moore); set of eggs, May 14, '85 (Parker); Radnor Twp., 3 spec. by Dillon (Phila Acad. Nat. Sci. Coll.), breeds, uncom. (Rogers); nest and eggs (Harlow); Swarthmore, spring date (Roberts); set of eggs, May 6, '05 (Swayne *ms.*); Marple Twp., nest May 18, '09 (Mercur *ms.*). Elwyn, spec. Apr. 26, '98, C. S. Welles (Phila. Acad. Nat. Sci. Coll.); Castle Rock, nesting (Sharples); Grant Groff found it breeding near Radnor Hunt, '94 and '95; Alfred C. Redfield near Wayne, '08 and '09; and the writer in Newtown Twp. (Burns *ms.*). Chester Co., I found 4 nests (Warren); resident; breeds (Ressel); Avondale, resident and quite rare (Michener); East Marlboro Twp., set of eggs May 20, '06, resident, I never considered it an abundant breeder (Pennock *ms.*); West Chester, adult shot (Montgomery); set of eggs May 24, '75; by J. T. Price (Jackson); West Goshen Twp., set col. May 28, '96, by Chas. Darlington, three sets '86, '88 and '90 by Thos. H. Jackson. I have known 4 or 5 pairs which nest here every year. Some years ago the Red-tailed Hawk was a com. nesting bird, but lately it has almost disappeared and the Broad-wing has taken its place until it is one of the most abund. (Sharples *ms.*); Marshallton, May 19, '00, set by Frank Marshman; Brandywine val-

ley, May 19, '04, and near West Chester, May 16, '03, sets by R. P. Sharples; Hershey's Mill, set May 3, '91, by S. B. Ladd (Jackson and Sharples *ms.*); West Bradford, breeding (Burns *ms.*); Brandywine Hills, sets May 15, '05, and June 1, '06, by W. Woodward (Sharples *ms.*); near Coatesville and near Downington (Sharples); Malvern, nest, by Wm. Everett, May, '86 (Jackson); Paoli, Daylesford (earliest breeding record, May, '84, by Wayne Baugh), and Bérywn and Devon regular S. R., breeding, first set May 11, '88 (Burns *ms.*). Lancaster Co., rather rare (Libhart); Columbia not com. (Wisler *ms.*). York Co., one noted May 1, '04, first in 16 years' observation (Wisler *ms.*). Dauphin Co., Harrisburg, by no means com. I have but one record, a male, taken Mar. 21, '95, though I do see some birds flying high over the city during migrations (Stoeys *ms.*). Cumberland Co., Carlisle, rare (Baird). Perry Co., Pilot Knob, com. transient visitant in flight during Sept. '88 (Roddy *ms.*). Clinton Co., Renova, one of our most com. hawks and regular breeder (Pierce *ms.*). Erie Co., Erie and Presque Isle, recorded by our party on but two occasions, but probably a S. R., immature male shot May 26, and one seen Sept. 21; Mr. Bacon saw one from this locality (Todd), Clarion Co., Maysville, spec. shot June 15, '94, my nearest Pittsburg record (Todd *ms.*). Green Co., in the summer of '04 a pair inhabited a large strip of woods south of Waynesburg (Jacobs *ms.*). Fayette Co., Leckrone, Sept. 24-Oct. 8, '01, one or two in woods back of station during my stay (Burns *ms.*).

DELAWARE.—Resident (Rhoads and Pennock). Newcastle Co., Townsend, one recorded June 28, '00 (Burns *ms.*).

MARYLAND.—Resident except severe winters, but at no time abundant (Fisher); resident, but not com., eggs Apr. 27, '90; May 19, '92—Blogg; May 23, '93—J. H. Fisher, Jr. (Kirkwood). Anne Arundel Co., West River, fall '89, appeared in greater numbers than ever before (Ellzey); Montgomery Co., Sandy Spring, number of spring and summer records (Fisher); eggs, May 10, '87, col. by Dr. A. K. Fisher (Bendire); one set in '91 and three in '92 (Kirkwood); near Tacoma Park, nestlings, '97 (Shufeldt). Howard Co., fall, '89, extraordinary numbers of hawks, Broadwings predominating (Ellzey). Alleghany and Garrett Cos., not com. (Eifrig *ms.*). Allegany Co., one on Wills' Mt., July 28, '02, and numerous Sept. 4-Oct. 17, also records from various localities, one Dec. 31, '01 (Eifrig *ms.*). Garrett Co., one taken on summit of ridge about 3 m. east of Grantville (Preble); Occident, July 22, '03, immature female brought to me (Eifrig *ms.*).

WEST VIRGINIA.—Resident, tol. com. (Edwards); tol. com., several spec. taken (Doan); com. (Brooks). Monongalia Co., Mor-

gantown, while hunting here below town in the fall of '06, a man killed one and brought to me for identification, the only one I ever saw about here (Morgan *ms.*). Upshur Co., remains throughout the year (Brooks); Buckhannon, Aug. 12, '88 (Fisher). Kanawha Co., com., found mostly in the mountains, breeds (Scott); Coalburg, com. and breeding (Scott). Putnam Co. In the spring of '01, my brother and I found a nest in a tall hickory tree; he shot one of the birds, and a few days later he killed another in a different part of this locality that acted as though it had a nest close by. I have not found it very common in the parts of the state I am acquainted with (Morgan *ms.*).

VIRGINIA.—Occurs (Whitehead); occasionally seen, but not of sufficient abundance to make it of much economic importance (Smyth). Montgomery Co., saw Sept. '93, a flock of 13, all flying south and very high (Smyth); Blacksburg is in a valley on the top of the Alleghany system, about 2020 ft. above sea level, and the country around it is rugged, with many wooded and wild ravines. I believe that it nests regularly though sparingly throughout the mountainous section. In past years, nearly every spring, in late April or early May, when I used to be out frequently after insects, observing bird arrivals and collecting flowers for my botany class, I saw these hawks, usually very tame and acting as if nesting, and I once saw a pair attacking and driving away from their chosen haunts a Red-shouldered Hawk. I never, however, saw its nest until May 18, '06, when a farmer brought me an incubating female. I went with him intending to get the nest and eggs, but it was in an enormous white oak. It is not abundant, tho' I count it in my list of regular breeders (Smyth *ms.*); Fairfax Co., near Washington, found breeding by Dr. Fisher and Mr. Henshaw in '85, rare resident (Rives); Centerville Twp., set May 19, '91, by Harry K. Jamison (Crandall *coll.*); Falls Church, not uncom. breeder (Riley); numerous breeding records (Riley *ms.*). Hanover Co., Ashland, one seen Mar. 15, '06 (Embody *ms.*). Warwick Co., I saw one a negro had shot, May, '87 (Phillips).

DISTRICT OF COLUMBIA.—(Jouy); very rare, only occasionally observed (Coues and Prentiss); rare, probably resident, more in winter (Coues and Prentiss); not com. (Richmond); nesting in the National Zoological Park (Baker); rare and occasional (Rives); not com. W. V., rare S. R., according to C. W. Richmond (Chapman); breeding (Maynard); permanent resident (Cooke); not uncom. breeding bird (Riley).

NORTH CAROLINA.—Wake Co., Raleigh, specimens May 23, '88, Aug. 26, '89, May 8, '95, and sets of eggs: Apr. 25, '90; May 18, '91; and May 11, 16 and 22, '95 (Brimley *ms.*). Mitchell Co., Roan Mt.,

Aug. 10, '87 (Fisher). Buncombe Co., S. V., com. (Cairns); set May 28, '01, for S. B. Ladd (Sharples *coll.*); Weaverville, found breeding by John S. Cairns (Bendire); Grace and Craggy mountain, sets of eggs June 18, '94, and May 8, '86, by Cairns (Crandall *coll.*). McDowell Co., Black Mts., 6,000 ft., single bird (Brewster). Jackson Co., Webster, a pair (Brewster).

SOUTH CAROLINA.—Listed by True; probably occurs, but I have no evidence that such is the case (Coues). The record by Mr. F. W. True is based on presumptive rather than positive evidence. The list is crude and full of errors. Coues' list is full to overflowing with errors. I have but two records on or near the coast. On April 26, '86, while in the company of Dr. A. K. Fisher, he identified a bird of this species which was about 400 yards away. The second record is of a specimen that I shot near Charleston on June 15, '89. It seems to be very rare even in the primeval forests. As far as I am aware, it does not breed. While it is possible that it breeds in the primitive forests, the fact remains that no well authenticated record is extant (Wayne *ms.*). It probably occurs, however, along the upper Savannah river (Wayne).

GEORGIA.—Resident (Cleckly). Does not appear to be common. Hawks seem to be less abundant than in any other section where I have been, Red-tailed, Cooper's and Sparrow Hawk being the only species that abound. Red-shouldered, Sharp-shinned and Marsh Hawks being less in abundance. The Broad-winged Hawk and Mississippi Kite being rare—though I am fortunate to have a fine pair of the latter—and the Duck and Pigeon Hawks and Swallow-tailed Kite being very rare (La Prade *ms.*). While labeling up our collection—Savannah, Natural History Society—recently, I came across a hawk which I was convinced was originally wrongly marked, and upon close investigation it turned out to be a Broad-winged Hawk, immature male taken Mar. 11, '08. It is the only one in our collection, and in fact the only specimen I have ever taken (Hoxie *ms.*). Cherokee Co., on July 11, '05, I found one nailed to a tree, having been shot by some hunters some days before. I had previously seen a pair in this vicinity, but failed to get close enough for positive identification, tho' my impression was that they were of this species (La Prade *ms.*). Fulton Co., June, '06, exact date not recorded, I heard the Killdeer-like cry in some heavy timber. The bird flew before I got in range and I failed to get it in the chance shot I tried. W. J. Mills, formerly of East Point, but now of College Park, has a set of eggs taken in the county that I consider *probably* of this bird; though I am not oologist enough to be a competent judge. He took them some years before he was acquainted with our birds, being a native of Eng-

land (La Prade *ms.*). Atlanta, six seen Dec. 25, '03 (McDaniel). Newton Co., Oxford, I have for seven years been trying to secure one for the Emory College collection. Yesterday, Apr. 27, '08, I took an immature male in thick woods (La Prade *ms.*). In a memoranda of a collection of eggs made chiefly on St. Simon's Island (Glynn Co.), Wayne and McIntosh Cos., during '53-'65, by the late Dr. S. W. Wilson; H. B. Bailey notes the species—"nests in high trees, eggs two or three." Camden Co., St. Marys, it does not breed. In fact I have taken but one and seen one other, both in winter. It may, however, breed in other parts of the state, as it is no more rare here than the Mississippi and Swallow-tailed Kites, and the latter at least is quite common in some sections (Arnow *ms.*).

FLORIDA.—There is a specimen in the Museum of Comparative Zoology labeled as having been taken in Florida (Allen). One spec. each by Dr. E. G. Abadie and Thos. McEuen (Phila. Acad. Nat. Sci. Coll.). Bird appears nowhere a very common species, with perhaps the exception of the peninsula (Brewer). Eggs found by Gustavus Wordemann (Baird, Brewer and Ridgway). Kissimmee Valley, one seen Feb.-Mar., '95 (Palmer). Jefferson Co., one of the commonest hawks found breeding in the hill country and on the Wacissa river (Wayne); while I did not collect any sets of eggs, it is a *common* breeder near Waukeenah. Shot a female Apr. 21, '94, that contained an egg ready to be laid (Wayne *ms.*). Leon Co., Tallahassee, common resident, breeds (Williams); there is scarcely a strip of woods of 50 acres or more wherein are not found a pair of these birds (Williams *ms.*). Walton Co., De Funiak Spring, somewhat rare, May 2, '08, I shot an adult female and observed another Apr. 23, '10, at Lake Cassidy, and an adult male in a cypress swamp, June 23, '10 (Fisher *ms.*). Scambia Co., Pensacola, one seen, spring of '86 (Everman). Volusia Co., Coronado, Dec. 30, '08 (Longstreet). Hillsborough Co., not present to my knowledge (Hoyt *ms.*); reported breeding (Bendire). Manatee Co., it has been reported breeding and an egg collected by H. B. Moore, Manatee, spring of '72, and now in the U. S. National Museum collection, entered as one of *B. lineatus*, seems much more likely to be referable to this species (Bendire). Lee Co., Fort Myers—Caloosahatchie region—migrant (Scott); seen (Maynard) Key West, single one Feb. 3, '88; 150—mostly of this species.—Oct. 21, '87 (Scott).

ALABAMA.—Found (Oberholser) Hale Co., only one specimen has come under my observation, that was shot and mounted by Dr. J. M. Pickett of Cedarville. I have the specimen in my collection (Avery). Coosa, Clay and Talledega Cos., abundant soon after

May 25, '08 (Saunders). Mobile Co., Mobile, Dr. A. K. Fisher tells me that he saw a pair in May, '86 which acted as if they had a nest in the vicinity (Bendire).

MISSISSIPPI.—Resident, rare breeder (Stockard). Not a common resident. It gathers in small flocks for migration together with *Ictinia* in late summer and usually all are gone by the first of Sept. I have not seen it in winter (Allison *ms.*). Pine flats region (Kopman). Tishomingo Co., the commonest of the hawks—Apr. 17-May 17—I found no nests, but saw and heard the birds often (Allison). Lafayette Co., three sets of eggs in one season (Norris). Franklin Co., Suffolk, not met with up in this section; its occurrence has been reported to me from near the Gulf (Kent *ms.*). Wilkinson Co., Woodville, two observed Dec. 25, '09 (McGowan). Coast of Mississippi, com. S. R. (Kopman).

OHIO.—Not com. resident except perhaps in winter, breeds. In the vicinity of this city it is rare. Dr. Kirtland says that it is com. and breeds in Northern Ohio. Mr. Read that it is frequently seen (Wheaten). Not com. S. R. (Dawson). Little known, not because it is rare, for it is present in some numbers throughout the state; but because it apparently differs but little from several medium sized hawks. It should be found wintering south of Columbus, but probably in small numbers (Jones). Stark Co., Canton, single individuals, Apr. 18, '09, Mar. 27, Apr. 24 and May 15, '10 (Kimes *ms.*). Mahoning Co., Youngstown, one seen Dec. 25, '06 (Fordyce and Wood); Poland, male adult—Kirkland (Sharp); spec. in British Museum (Gray). Cuyahoga Co., Cleveland, tol. com. migrant and S. R. (Anon.); Brooklyn, May 10 (Fisher). Lorain Co., Oberlin, rare permanent resident (Jones); spring dates (Baird); present, noted in May, '97 (Dawson); two, winter of '02, usually near Lake Erie (Dawson); Cedar Point, sometimes com. for a day or so during migration, unusual in winter and rather scarce in summer (Jones). Wayne Co., rare, probably S. R., only two records available: that of an adult shot on the grounds of the State Agri. Exp. Station at Wooster, July 4, '93; and one seen about six miles north, July 9 same year (Oberholser). Knox Co., breeds (Davie). Franklin Co., Columbus, S. R., com. (Davie); resident (Dawson). Auglaize Co., one seen May 14, '08 (Henninger and Kuenning). Miami Co., Troy, male killed Apr. 27, '07 (Fisher *ms.*). Green Co., Yellow Springs, nest and eggs by W. M. Wilson (Wheaton). Warren Co., rather uncom. S. R., Apr. to Nov. (Smith). Hamilton Co., Cincinnati, S. R., and Madisonville, Apr. (Langdon). Scioto Co., Southwestern, May 28, '96 (Henninger).

INDIANA.—Rare in most localities; resident in southern part, S. R. northward, not com., most often seen in spring and fall (Butler).

Lake Co., breeds—Aiken (Butler). Wabash Co., two spec. taken (Ulrey and Wallace). Carroll Co., occurring occasionally (Everman). Franklin Co., rare, probably resident (Butler); Brownsville, Apr. 19, '87, and Decatur Co., Apr., 22, '87, spec. (Fisher). Monroe Co., rather rare R., not reported before '92, more often seen in recent years, commonest in Apr. and Oct. (McAtee). Knox and Gibson Cos., breeds (Ridgway).

ILLINOIS.—Resident, one of the rarest species in most localities (Ridgway); transient, breeding in the northern part (Ridgway); not uncom. first week in May and during Sept. in N. E., a few breed (Nelson); com. during migrations and more or less com. S. R., breeds in many localities (Cory); fairly com. during migrations, isolated pairs breeding here and there, but not com. as a S. R. in any given locality (Gault *ms.*). Lake Co., Lake Forest, fall '95, one in company with other species in flight (Ferry). Cook Co., Chicago, present '88 (Pratt); abund. trans. (Dunn); not uncom. S. R. (Woodruff); South Chicago, flight Apr. 27, '92 (Dunn); Grand Crossing, Sept. 6, '84, male shot (Coale); River Forest, male taken May 11, '81 (Gault *ms.*). Du Page Co., Glen Ellyn, not com. T. V., one or more recorded every spring and fall, with few exceptions, since '93, evidently breeding pair noticed May 1-24, '10, but no nest located (Gault *ms.*). Will Co., Joliet, set of eggs May 10, '06 (Cory). Marshall Co., rare, confined to river bottoms (Barnes). Fulton Co., Bernadotte, Spoon river region, pair Jan. 13, '87 (Strode). Hancock Co., Mallard, spec. Oct. 8, '00 (Fleming coll.). Adams Co., Quincy, found breeding by Poling (Davie, Bendire). Champaign Co., Philo, breeds, 4 yg. taken from nest (Hess *ms.*); not rare S. R., seen each season at Lynn Grove and Salt Fork (Hess). Bond Co., not very plentiful, the country is right for it, but its place seems to be taken by the Red-tail and Red-shoulder, almost every grove containing one or two pairs of the former (Smith *ms.*).

MICHIGAN.—(Stockwell, Miles); nesting (Herbert); S. R., breeding (Steere); rather rare, breeds (Gibbs); com. S. R. (Cook). Southern, trans. (Bois); cannot be called com., neither is it rare; I have never known it to breed (Covert). S. E., it is rather an uncom. but regular migrant, extreme dates: Mar. 10, '94, and Oct. 24, '97; normal Apr. 20 and Oct. 5 (Swales *ms.*). Washington Island, S. W. end of Isle Royale, 5 observed Sept. 5, '05 (N. A. Wood *ms.*). Ontonagon Co., Ontonagon, Aug. '04, not com. (N. A. Wood *ms.*); Porcupine mts. 1 yg. male and ad. female Aug. 12 (Wood, Peet and McCreary). Iron Co., one each on Menominee river, Aug., and upper course Iron river, Sept. (Blackwelder). Dickinson Co.,

Iron mt., not uncom. in summer, but never found its nest (Brewster *ms.*). Chippewa Co., set May 16, '01 (Stone *coll.*). Mackinac Island, one Sept. 1, '89, rare (White); Huron Co., Port Austin Twp., annual spring flight (J. C. Wood *ms.*). Emmet Co., Wequetonsing, nest near golf links (Widmann). Kent Co., breeding—White (Cook). Eaton Co., Lansing, one shot at Agri. College and another Sept. 10, '96, by E. M. Sedgwick, now in my coll. (Hankinson *ms.*). St. Clair Co., Pt. Gratiot, set May 15, '98 (Arnold *ms.*). Wayne, S. Oakland, E. Macomb, S. St. Clair Cos., fairly abund. migrant. I am positive it breeds, but to my knowledge no eggs have been taken (Swales). Wayne Co., most com. during the latter half Apr. and early May, when from singles to 200 or 300 may be seen at one time in the air, few adults alight, but many of the juniors do so and some remain in suitable localities until middle of June, four breeding records (J. C. Wood *ms.*); Highland Park, only one breeding record, Apr. 29, '93 (Swales); Nankin Twp., nest '01, no eggs (J. C. Wood *ms.*); Detroit, male shot June 7, '07, non-breeding upon dissection (Swales *ms.*); I have seen more birds passing over city than elsewhere (J. C. Wood *ms.*). Genesee Co., Goodrich, spec. (Spicer). Washtenaw Co., Ann Arbor, com. (Steere); not very com. migrant, one breeding record, June 25, '01, birds taken but nest inaccessible (N. A. Wood). Monroe Co., Petersburg, not uncom., breeding (Trombly, Cook); Portage Lake, fall record, Oct. 12 (N. A. Wood *ms.*).

Summerfield, set col. by Jerome Trombly, May 18, '92 (Jackson *coll.*). Hillsdale and Lenawee Cos., a retiring bird found only in deep woods (Gibbs). Kalamazoo Co., as an evidence of its rarity here, in over 500 nests of the *Buteos* robbed, only one set of this Buzzard was taken—May 27, '75 (Gibbs).

WISCONSIN.—Com. (Hay, Goodrich); com. in northern portion where it breeds in the heavy timber (King); not rare, especially in the oak openings; as far as my experience goes, it seems to prefer second growth black "jack" or "pin" oak forests (Kumlien). Eastern Wis., rather com. spring migrant, especially common in fall; by no means com. nesting species, but is a S. R. and breeds from the southern tier of counties northward. According to our observations this is the species that flocks (Kumlien and Hollister); male and female, Sept. 9 and 21 (Ridgway); com. during migrations, more or less com. S. R., breeds in many localities (Cory), Dunn Co., Mr. Clark considers it on the whole uncom., but has seen and taken it a number of times (Kumlien and Hollister). Clair [Clark?] Co., a spec. taken—Cowper (King). Ontegamie Co., com. in large woods (Grundtaig). Waukesha Co., Pewaukee, I found them nesting and most com. (Goss); breeding, set June 8, '88 (D.

C.). Jefferson Co., Lake Mills, breeding—Cantwell (Bendire). Richland Co., Twin Bluffs, com. (McCallum).

KENTUCKY.—Fayette Co., Lexington, my records are all queries, I have never examined it in hand. The ms. in *Bird Lore* Christmas Census had it and some of the Ducks queried; the one we called Broad-winged Hawk was never identified with any certainty (Dean *ms.*). May 7 and Dec. 25, '04, March 18, '05—[Dean?] (Cook *ms.*). Logan Co., Nov. 28, '03 (two); Oct. 25, '04; Apr. 9 and 14, May 5, 14 and 26, '06, single individuals. While I have not found in the nest, the above data shows that it occurs well into the breeding season. I am inclined to consider it a rather rare breeder and uncom. migrant and winter visitant (Embody *ms.*).

TENNESSEE.—East: This is the most abundant hawk, especially so among the mountains, where I found it at the loftiest mountains (Rhoads). Near Roan Mountain Station, July 24, '95, seen (Cooke *ms.*).

MINNESOTA.—S. R., fairly com. from the border of Iowa to Lake Superior, rare in the N. W. sections (Hatch). Very numerous, the most abund. of all the hawks (Brackett, Cantwell). Headwaters of streams that feed in Red River of the North, breeding abundantly (Preston). Polk Co., Red Lake Falls, male by F. Guy Mayers (Phila. Acad. Nat. Sci. Coll.). Atkin Co., Farm Island Lake, com., breeding (Peabody); Atkin and Hickory, several noticed (Gault *ms.*). Beeker Co., abund. (Roberts); Floyd Lake, several sets (Norris). Otter Tail Co., Mr. Washburn found it rather com. (Hatch); Pelican river, set of eggs (Norris); one pair nested near Crystal lake, two eggs were taken May 28, '93, and afterwards found to be the commonest hawk in nearly all the localities visited. Almost every piece of woods of any extent was found to harbor a pair. Another set was taken at Linda June 3. Not found at Pelican Rapids (Gault *ms.*). Grant Co., Herman, single individual (Roberts and Benners). Lac-qui-parle Co., breeding (Cantwell). Hennepin Co., set taken by H. M. Guilford (J. C. Wood *coll.*); Minneapolis, com. 7 sets within 5 m. radius of center of city (Currie); breeding (Patten, Cantwell); set taken by H. B. Hurd (Crandall *coll.*); breeding frequently (Hatch); Lake Harriet, breeding (Currie); Lake Minnetonka, breeding frequently (Hatch); Fort Snelling, spec. May 2, '89 (Fisher), Steele Co., Owatonna, breeding Apr. 29, '99 (Springer); breeding (Peabody). Waseca Co., Woodville and Goose Lake, breeding (Peabody); Woodville, several sets col. by D. A. Kinney (Jacobs *coll.*).

NORTH DAKOTA.—I am quite certain it does not breed in the woods of the prairie region, but suspect that it may do so rarely in the Turtle mountains, though I believe I have never seen it there

in summer. On July 12, '02, I found at Fish Lake, Turtle mts., a dead ad. Broad-wing hanging in a small tree. This bird had been dead so long that it was dry, but may have been breeding there. It had evidently been shot. The female I took at Rock Lake was not a breeding bird, and I have no other record that I can find of any having seen the species in summer (Bishop *ms.*). Tower Co., Rock Lake, June 4, '95, yg. female shot (Bishop *ms.*); Cando, occurs as a fairly com. migrant. I have no records of its breeding, though I have seen it in season. Specimens are hard to get as it does not stop long in open country (Judd *ms.*). Ramsey Co., Devil's Lake, May 4 and 11, '02, two adults, the former a female, by C. W. Bowman (Bishop *ms.*). Nelson Co., Stump Lake, May 1, ad. male by Alfred Eastgate (Bishop *ms.*); Talma, transient visitor, spring and fall, Apr. 4-20, and Sept. 10-Oct. 20 (Eastgate *ms.*). Griggs Co., Red Willow Lake, May 16, '02, yg. female by Alfred Eastgate (Bishop *ms.*).

SOUTH DAKOTA.—Sanborn Co., Forestburg, on two occasions, one June 6, '05, I have seen a hawk, which I took to be of this species, but was unable to secure it. My friend, Frank Patton, of Artesian, after years of thorough collecting, must still question its occurrence in Sanborn and Minor Cos. (S. E. Central) at least. He has thought that he saw it once or twice. H. E. Lee of Huron (Beadle Co.), a careful observer and collector, has not found it in his vicinity, at least up to two years ago (Visher). Hughes Co., Pierre, I have two records. One dated Mar. 25, '06, and one Apr. 12, '07. The first occurrence I am absolutely positive as to its identification, as I shot the specimen out of a large flock—for hawks—perhaps fifteen individuals, and identified it as a male Broad-wing. It was very emaciated, seemingly nothing in its stomach whatever. The one I saw last spring was some little distance away, but I am sure it was this species (Lee *ms.*).

IOWA.—I found it very plenty, never found it breeding (Krider); not uncom. from Apr. to Oct. (Keys and Williams); fairly com. on the average, being quite com. in some portions and almost lacking in others (Keys); appears to have been somewhat irregularly distributed, as far as a number of observers fail to report its occurrence, some reported it as a com. migrant, and others as rare (Anderson). Kossuth Co., W. H. Bingham reports it as com., a few breed (Anderson). Mitchell Co., spec. '80, by Dr. W. L. Abbott (Phil. Acad. Nat. Sci. Coll.). Winnebago Co., I found it com. in spring and fall, and rare in summer (Anderson); Lake Mills, breeding June 30, set of three eggs; another nest same date, a mile or so away, but the one egg broken. In late June, '07, I visited this locality and noted one individual, unquestionably a

Broad-wing, sailing leisurely above the timber (Law *ms.*); Forest City, Apr. 28, '94, saw a pair about a small grove, probably nested there a little later in the season (Anderson). Benson Grove, spec. May 15, '75, D. Hill (Phila. Acad. Nat. Sci. Coll.). Hancock Co., Silver Lake, apparently com. May 3, '83, and at various other times, as a migrant (Preston). Winneshiek and Allamakee Cos., Onota valley, several seen between June 11 and July 10, '95, but none secured (Bartsch). Black Hawk Co., Laporte City, migrant, trans. (Cooke). Scott Co., tol. com. migrant in spring, rare in fall; spring dates and one fall record (Wilson). Poweshiek Co., trans. visit., tol. com. (Kelsey); Grinnell, migrant, trans. (Cooke). Eastern Jasper and Western Poweshiek Cos., tol. com. S. R. (Jones). Pottawatomie Co., set eggs, '92 (Trostler).

NEBRASKA.—Rather com. during the fall along the bluffs of the Missouri river (Taylor); a regular and rather com. S. R. and breeder along the Missouri and its tributaries in the eastern part, rare in the interior and a straggler in the western part (Bruner, Walcott and Swenk); used to be a rather frequent S. R. and breeder throughout the eastern portion, but it is becoming scarcer every year (Trostler *ms.*). Cuming Co., West Point (Bruner). Douglas Co., Omaha, set of 2 eggs May 15, '92; not so com. as *B. swainsoni* (White); breeding—L. Skow; rather rare, breeds in May—I. S. Trostler (Bruner); set of 2 eggs May 19, '01, in Child's Point woods, six miles south of Omaha, taken by Roy Mullen—the only nest that has come under my notice (Shoemaker *ms.*). Becoming scarcer every year, especially in Douglas and Sarpy Cos. (Trostler *ms.*). Otoe Co., Nebraska City, male shot July 17, '09 (Burnett *ms.*). Nemaha Co., Peru, spec. killed fall '88 and brought to the Laboratory of the State Normal (Taylor and Van Vleet). Lancaster Co. Lincoln, (Bruner). Antelope Co., Neleigh, four seen in the Upper Elkhorn valley, flying northward, Apr. 26, '00, and one secured (Carey). Rock Co., Long Pine, observed by Bates (Bruner, Walcott and Swenk). Sioux Co., Harrison, observed (Bruner).

MISSOURI.—S. R., breeds in all parts except the swampy S. E. counties (Widmann *ms.*). Fairly com. S. R., mainly eastward, less commonly westward. It prefers undulating ground where wooded tracts, even of medium trees, adjoin creek bottoms, wet meadows and cultivated fields. Such localities still exists in spite of the universal devastation of timber, in most parts of the State. It seems to shun the swampy southeast and the bottoms of the large rivers as well as the dry ridges of the Ozarks and the dryer stretches of the prairie region. None winter with us (Widmann). I have taken their eggs (Smith *ms.*). Cooper Co., Mt. Carmal,

Mar. 23, '85, transient—Mrs. M. Musick (Cooke). St. Louis Co., abund., migratory, Sept. 21 (Hurter). Carter Co., Grandon, nest found '07 in the valley of the Little Black river (Woodruff).

KANSAS.—Rare S. R. in eastern (Snow, Taylor). The only distinctly *eastern* hawk occurring in the Mississippi valley. It is found rarely as far west as Kas. (Cooke). S. R. in eastern part, rare, arrives about the first of Apr., leaves by the first of Nov.—at least I have not seen them later (Goss). Although I have no record of its breeding, I believe it will be found a rare S. R. in the timber bottoms (Wetmore *ms.*). A rare S. R. in eastern Kas. (Lantz). Douglas Co., Laurence, May 4, '04, female, by Leverett A. Adams; and another female May 17, '07, collector unknown—both records in the museum of the University of Kansas (Wetmore *ms.*). Shawnee Co., Topeka, migratory, rare, taken by E. U. Prentice (Snow). Montgomery Co., Independence, I observed the species in Apr., and May 6, '06, while collecting, although none were taken I am reasonably sure of the bird, as I am familiar with it (Wetmore *ms.*). Ellis Co., the most westerly record being that of Dr. Watson at Ellis (Cooke).

INDIAN TERRITORY.—Occurs during the summer months occasionally (Goss).

OKLAHOMA.—Stillwater, one shot Apr. 9, '97 (Cooke *ms.*).

ARKANSAS.—I have, so far, not run across this species in the State. It should occur in some sections in the northern part, but I have been too busy to do much field work (Smith *ms.*). I have no positive record of its appearance here during my 14 years residence at Imboden, by actually getting specimens, but I feel reasonably sure I have observed them in flight while hunting on the lower White river. Quite a number of hawks frequent our State, and I have observed Swallow-tailed and Mississippi Kites here, but never found their nests (Bacon *ms.*). Van Buren Co., Clinton (on the Little Red river—a tributary to the White river), breeds, seen Feb. 18 and June 5, '90 (Cooke *ms.*).

LOUISIANA.—It is believed that the Broad-winged Hawk is never seen in the State except during the severest winter in the middle and eastern districts (Holmes). A fairly com. resident and breeding (Beyer). S. E., pine barrens, com. S. R.; fertile district, rare if not unknown (Kopman). Long-leaved pine flats region—at a distance varying from 50 to 75 miles from the coast on slightly higher grounds—S. E., com. S. R. (Kopman). Chiefly if not entirely a S. R. and confined as a breeder to the upland region, especially pine wood sections (Beyer, Allison and Kopman). Prairie Mere Rouge, one spec. (Baird).

TEXAS.—Southern, Nueces river eastward, not uncom. In May

shot yg. bird on the Medina, and early in June found a nest with young near the Colorado river (Dresser). Western; the eastern Broad-wing has been found along wooded rivers (Bailey). Neosho Valley, during the summer months (Goss). Tyler Co., rather com. S. R., breeds, does not winter here (Pope *ms.*). Waller Co., Brazos river valley, yg. birds of *B. lineatus*, or perhaps *B. pennsylvanicus* were noticed, but none were killed (Kumlein). Houston, Harris Co., and Montgomery, Galveston and Ford Bend Cos., not uncom. during the winter months and a few remain to breed (Nehrling). Travis Co., Colorado river, I have personally observed a pair during the past two springs in a large wood on the outskirts of Austin, probably they were breeding (Montgomery *ms.*). Kendall Co., winter resident—Sept. to early spring—frequenting the heavy timber bottoms and along streams (Wentworth *ms.*). Bexar Co., found (Beckman); San Antonio, fall and winter, pretty com. Nov., seven shot during the winter (Dresser). San Patrica Co., Mission of San Patrica, Sept. (Beckman); Barton's Rancho, fall and winter (Dresser). Nueces Co., Corpus Christi, male, Mar. 14, '99 (Fleming coll.). Cameron Co., Fort Brown—Brownsville, uncom. W. R. (Merrell); spec. Apr. 9 and 12, '94, by F. B. Armstrong (Phila. Acad. Nat. Sci. Coll.); I cannot recall having taken or seen it (G. P. Smith *ms.*). Hildalgo Co., Hildalgo, male shot May 7, '77 (Sennett); Lomita Ranch, not uncom. during Apr. '78. On Apr. 11, we saw 50 or more flying about over the woods. A few were taken in May. It is probable that a few remain to breed (Sennett).

MEXICO.—Lower California; Colorado delta, two or three were seen by S. N. Rhoads (Stone). Sinaloa: near Presideo de Mazatlan, by Forrer (Salvin and Godman). Jalisco: Volcan de Colima, by W. B. Richardson (Salvin and Godman). Vera Cruz: Jalapa, male collected (Ferrari-Perez); Los Vigas, two specimens secured (Chapman); Mirador, female. Sept. by Dr. Sartorius (Ridgway); Orizaba, taken by Batteri (Scalater); Coatepec, M. Trujillo (Salvin and Godman). Oaxaca: Santa Efigenia, Tehuantepec, immature, Dec. '68 (Lawrence); F. Sumichrast (Salvin and Godman).

SPANISH HONDURAS.—Occasionally met with in winter (Goss). (Salvin and Godman).

GUATAMALA.—Mr. Skinner reports its occurrence (Gentry). I have occasionally met with the birds in winter in the eastern part (Goss). Santa Rosa above Salma, and Duenas, San Geronimo (Salvin and Godman). Coban, Vera Paz, Jan. by Q. Salvin (Ridgway.)

SAN SALVADOR.—(Salvin and Godman).

NICARAGUA.—Rather com. on the Escondido during the winter months, first seen in Sept. (Richmond). La Libertad and Santa Domingo, Chontales, Leon—W. B. Richardson (Salvin and Godman).

COSTA RICA.—Coll. by A. Goering (Lawrence); ambas especies se encuentra en las alturas y desdaderos de las montanas que circunba la altiplanica (Frantzis); breeds (Zeledon); noted during Dec. and Jan. '89-'90, one seen Apr. 20, '90 (Cherrie); spec. by Frantzius (Ridgway). The most abund. and widely spread of the migrant species of hawks, being found in the low lands of both Caribbean and Pacific and over the central plateau region. It seems quite partial to the trees along the edges of streams and isolated patches of woodland (Carriker). San Jose,—C. T. Underwood, J. Carmial (Salvin and Godman); one spec. killed in Jan. (Boucard); last of Nov. to first of May (Cherrie). Jimenez (Zel- edon). Angostura.—J. Carmial; Carrillo, Barba—C. F. Underwood and San Lucas, Talamanca—Mus. Nac. Costa Rica (Salvin and Godman). Carrillo, ad. female Apr. 5, '95, and juv. female Nov. 6, '98; and Escazu, juv. males Dec. 15 and 26, '99 (Fleming coll.); also spec. in Bangs coll., by Underwood (Carriker). Rio Frio (Richmond). Guayabo, spec. by Ridgway and Zeledon, in U. S. Nat. Mus.; Cariblanco de Sarapiqui, C. H. Lankester coll.; Guapiles, El Hogar, Tucurriqui, four skins in Carnegie museum (Carriker).

PANAMA.—(Slater and Salvin, Sharp, Lawrence); Paraiso Station—Hughes, and Volcan de Chiriqui—E. Arce (Salvin and Godman). Boquete de Chetra, Calovevora, Calobre, V. de Chwequi (Salvin). Boquete—a small village at the foot of the volcano—and Volcan de Chiriqui, 4000 to 7500 ft., two ad. and one yg., all males, Feb. 27, Mar. 10 and Apr. 19, by W. W. Brown, Jr. (Bangs); Boquiti Chiriqui, alt. 4000 ft., ad. female Apr. 25, '03, Dwight coll., and juv. female, alt. 3000 ft. Dec. 16, '04, Dwight coll. (Fleming ms.). Chitra, Veragua, ad. female (Riley).

VENEZUELA.—(Salvin and Godman). Caracas (Gray); individual presented by Wm. von Lawsberge to the Museum D'Histoire Naturelle des Pays-Bas (Schlegel); female (Sharp). Merida, alt. 2000 metres, ad. male Dec. 20, '03, No. 6375 Fleming coll., and ad. female Mar. ? 24, '03, No. (2) Dwight coll., and juv. male Oct. 29, '03, No. (3) Dwight coll. (Fleming ms.); specimen (Ibering).

UNITED STATES OF COLOMBIA.—(Schlegel, Salvin and Godman, Salvin); coll. by James McLeannan (Lawrence); winter resident, female (Bárboza du Bocage). Santa Marta district, male, female ad. and female yg., winter resident (Bangs); Minea, Sierra Nevada, 2000 ft., male, Jan. 17, female Jan. 22 (Salvin and Godman);

Bonda, Nov. 13, '88 to Mar. 26, '90, and Valparaiso—alt. 5000 ft., Mar. 21, seven spec. coll. by Herbert H. Smith (Allen).

ECUADOR.—(Baird, Salvin and Godman); in winter (Dresser). Western, deux males adults, et deux jenne males, tuees a chimbo en octobre, novembre, et decembre (Berlepsch and Taczanowski). San Rafaet, deux femelle tuees en mars, col. by M. Stolzmann (Taczanowski and Berlepsch). Gualauiza, male by H. W. Bates (Sclater). Two males from the forest of Archidona, and a female from the summit of the high forest covered Guacamayo range, which has to be covered in descending to the Napo forests after leaving Baeza (Goodfellow).

PERU.—Upper Amazon (Dresser, Salvin and Godman). Rio Javari, spec. secured by H. W. Bates (Sclater and Salvin, Sclater). Chamicuros, Peruvian Amazons, ad. male, Jan. 1, '68, and ad. female Dec. 3, '67, by E. Bartlett (Sharp); (Goeldi). Huambo, une femelle tue le 9 Mar. '80 (Taczanowski). Maraynioc, une paire de novembre, '90, researches by M. Jean Kalinowski (Berlepsch and Stalzmann). Palcaju, female ad., Nov. '02, Dwight coll., and San Domingo Carabaya, Dept. Puna, alt. 6000 ft., female juv. Nov. 1, '02, Fleming coll. (Fleming *ms.*).

CUBA.—(Lembeye, Cabanis, Gundlach); resident (Gundlach); Dr. Gundlach informs me it is a resident species and breeds in the island, which Mr. Lembeye also confirms (Brewer); female juv. (Ridgway); Sedentario, se encuentra muchas veces in veredas y orellas de los montes (Gundlach) present (Cory). Gundlach usually found it on the border of woods along the roads that pass through them, and although the species is common, he has never found a nest; an example examined marked "male," but of the size of female, may possibly be wrongly sexed (Clark). Remedios, yg. male, June (Ridgway). Pinar del Rio Province, at San Diego de los Banos, a pair was seen, and a female shot on Apr. 7, '00, and on the 11th William Palmer shot a male at the same spot, probably mate of the former, that had remated. Previously while going up a tropical ravine in the mountains at El Guama, Mar. 21, with an Italian resident, we came upon a single bird perched in a tree, and as my companion was ahead of me, I handed him the gun to shoot, but he missed. El Guama is a valley in the mountains about four miles north of the city of Pinar del Rio. San Diego de los Banos is at the base of the chain of mountains that runs with the axis of the island in the western part (Riley *ms.*). Santiago de Cuba, Bayate, adult female, Feb. 2, 1906, and Holguin, juvenile male, Aug. 5, 1904, col. by O. Tolin (Burns coll.).

ISLE OF PINES.—A pair observed circling about the crown of La Tres Hernvanos mountains, Nueva Gerona, Apr. 3, 1910, about 2

p. m., offering an excellent view with the field glass from the top of the mountain (Read ms.).

PORTO RICO.—Specimen (Ridgway), com. resident (Gundlach), present (Cory).

BUTEO PLATYPTERUS INSULICOLA.

ANTIGUA.—Resident, seen by Ober (Lawrence); taken (Cory); one adult male May 29, '90, coll. by Cyrus S. Winch, and three immature females, Sept. 7 (2), and Nov. 26, '03, coll. by H. G. S. Branch (Riley).

BUTEO PLATYPTERUS RIVIEREI.

DOMINICA.—Not abund., found by Ober (Lawrence); coll. by Mr. Ramage (Schlater); (Cory); very com. all over (Clark); com., widely distributed and much more tame and unsuspicious than in the U. S.; particularly com. in the vicinity of Bass-en-ville; observed from time of my arrival until departure (Verrill).

BUTEO PLATYPTERUS ANTILLARUM.

MARTINIQUE.—(Lawrence); found present by W. B. Richardson (Cory).

SANTA LUCIA.—(Allen); collected by Mr. Ramage (Schlater); (Cory).

BARBADOES.—Ligon's History shows clearly that when the greater part of the island was clothed in natural forrests, a species of Buzzard was indigenous. This may have been *B. latissimus* [= *platypterus*]. Ligon writes: "The birds of this place (setting two aside) are hardly worth the pains of description; yet in order, as I did the beasts, I will set them down. The biggest is a direct Bussard, but somewhat less than our grey Bussard in England, somewhat swifter of wing; and the only good thing they do is, sometimes to kill rats" (Fielden); (Cory); locally extinct (Clark).

ST. VINCENT.—Everywhere abundant—Ober (Lawrence); found all over the island and is very com., breeds (Lister); (Cory); very com. all over; spring of '03 a nest was found in the Botanic gardens at Kingston (Clark).

BEQUA.—(Cory); it occurs regularly on the northern end—north of the Spring estate—where it breeds; Ober gives this bird as occurring on the Grenadines, but this must be a mistake, as excepting Bequia and Mustique, it is wholly unknown to the natives, nor could I find any trace of it (Clark).

MUSTIQUE.—Occasionally visits (Clark).

CANNOUAN.—(Cory).

CARRACOU.—(Cory); I saw one on Aug. 27, '04, near the late John Grant Wells' residence at Hermitage, but as he does not record it from that island, it must be a rare straggler there (Clark).

GRENADE.—Not abund. resident, at this time—Mar. 25—it is engaged in incubation—Ober (Lawrence); numerous, breeds (Wells); living specimen presented by Hon. Sir W. Francis Helz-Hutchinson, July 20, '91, to the Zoological Society of London (Sharp).

TOBAGO.—Collected by W. W. Brown, Jr., during Apr. and May, '92 (Cory); immature female in U. S. National Museum (Riley).

Flight.

This bird is an easy, graceful, and at times, quite rapid flyer. Buteo-like, it is fond of soaring in circles. It can move with the ease and silence of an owl. Indeed, Sennett informs us that when he shot one in a dense woods on the lower Rio Grande, he was quite surprised that it was not an owl when he picked it up. When disturbed in the timber, its flight seems heavy and sluggish. Audubon, Gentry, Preston, Blanchan and perhaps others have noticed a peculiarity of its amusement flights, which take place occasionally during migration as well as during the breeding season, which is best described by Gentry: "It moves in wide spiral circles, without apparently vibrating the wings. These movements are prolonged at will, and often last for a considerable time. Their object cannot be the detection of prey, which such great height would assuredly favor, as it is seldom that its apparent absorption is broken, even when its most favorite quarry comes in full view. It is purely the result of pleasurable emotions. When weary thereof, it glides earthward with a momentum truly wonderful; but just before it reaches the ground, it checks its velocity with surprising skill."

Without attempting a display of mere words, Preston's account adds something to our knowledge: "On warm summer days, this bird forsakes its ordinary flapping flight and the shadows of the woods, and indulges in a series of ærial performances befitting a bird of higher station. Suddenly, one will start up briskly from some dead tree in the forest, and begin its upward course in short circles, rising quickly and easily, by gradually widening spirals, assisting itself by vigorous flapping until well up, when the metallic scream ceases, and with full spread wings and tail it soars lightly back and

forth, still tending upward until almost out of sight, and with arrowy swiftness the gay fellow descends with long sweeps and curves, closing the act with a horizontal dash far over the woods and marshes."

A. B. Klugh, Guelph, Ontario, informs me that on September 11, 1903, he observed a flock going through a performance never before or since witnessed by him. They were sailing around at various altitudes over a large "bush." Every few minutes, one would close its wings, shoot down a sharp incline almost to the tree tops, and then swoop upwards again. As they checked their descent, they produced a tremendous noise almost like an explosion. This noise gave one the impression that he was about to be hit on the head, and it made him duck every time, even though aware of what produced it. Gentry thinks its flight recalls that of *B. lineatus*, and Saunders likens that of *Archibuteo lagopus sancti-johannis* to it, in method of execution.

Food.

The rather sedentary Broad-wing most frequently waits for its prey while perched on a convenient stub or dead limb. A slight stir below and it bends forward with dilating pupils, cat-like, with twitching tail, swaying body, light foothold; it springs forward with marvelous quickness, snatching up the object with its talons; if its captive is not too heavy, it carries it to one of its favorite perches, there to devour it unless disturbed, when it reluctantly retires after a whistled protest. Very small mammals are swallowed whole, and the larger skinned and even the leg bones clean-stripped and left attached to the hide. Birds are plucked of primaries, rectrices and a few breast feathers, flinging them aside with a quick flirt of the bill; after tearing off and devouring the head, the body is ripped open and the intestines eaten, piece by piece the limbs and body follow. Large snakes, toads and frogs are usually skinned, and smaller ones torn in sections after the head has been disposed of. Crawfish are eaten piecemeal, and insects, spiders, etc., usually disappear intact. I have seen it fly toward its nest with a mouse dangling from a single

sharp talon in its throat, and a medium-sized snake grasped firmly with both feet; yet kite-like, it will sometimes securely hold an uninjured beetle, grasshopper or earthworm, in one foot bent forward to breast, and resting on the other, delicately pick the tidbit to pieces. At times it is said to hunt on the wing, circling in the air, upon sighting its quarry it becomes stationary for an instant and then descends with considerable velocity, thrusting forward its feet with lightning-like rapidity, securely grappling its victim only when its body follows or its legs bend in the rise; unlike the Osprey which seems to have the power to clutch with extended leg, its hold is secure only upon this movement. Digestion is comparatively rapid and the indigestable parts, consisting of the nicely-cleaned bones enveloped in the hair, feathers, etc., are regurgitated in the form of pellets before fresh food is taken.

After going to considerable pains to secure most of the literature bearing on the food subject of this species, I find little of it available because much can be traced back to the often careless statements of the early writers, and some of it undoubtedly original, seems to lack authenticity. For instance, after informing us that it very rarely feeds upon small birds, one writer includes in a partial inventory of its fare, eight species of birds; a number equal to the examination of at least one hundred stomachs though he nowhere states that he examined a single one; moreover, corroborative evidence is lacking, not a single species given by him appearing in the compiled list I shall presently offer.

Dr. Fisher, who has devoted much time to the food habits of the Hawks and Owls from an economic standpoint, states in regard to this species: "Among the mammals the smaller squirrels and wood mice are the most frequently taken, though field mice and shrews also are found in the stomach contents. During August and September a considerable portion of the food consists of the larvæ of certain large moths which are common at this season, and it is the exception not to find their remains in the stomach examined. Grasshoppers, crickets and beetles are also greedily devoured. The only act which seems

to be injurious to agriculture is the killing of toads and small snakes; the former of which are exclusively insect-eaters, the latter very largely so. In one respect the enormous value ranks above all other birds, and that is the destruction of immense numbers of injurious larvae of large moths, which most birds are either unable or disinclined to cope with."

Bristol Co., Mass. Nest of two young, three or four days old, also contained a full grown red squirrel (Carpenter *ms.*).

Godbout, Quebec.—The food of some I examined here, seem to consist of mice and small birds, and in one case I found remnants of the Northern Hare, but I do not think it kills them regularly, it was probably found dead.—(Comeau *ms.*).

Ottawa, Ont.—Those that I examined apparently fed on insects, small mammals, snakes and frogs. In fact it appears to be very fond of small wood frogs and grasshoppers. A favorite locality is a cedar swamp where there are lots of frogs and garter snakes.—(White *ms.*).

Portage la Prairie, Manitoba.—While with us it feeds upon mice and small rodents, I never had any complaints of its interfering with poultry and never found bird remains in its stomach.—(Atkinson *ms.*).

Norwich, Conn.—Chipmunks, red-squirrels and snakes.—(Richard *ms.*).

York Co., Pa.—On May 1, 1904, I was much surprised to see one swoop down, seize and carry off a red squirrel from the middle of the road, not more than thirty feet ahead of me. It then flew to a tree some hundred yards away, where I watched it through my field glass, tear and devour the animal.—(Wisler *ms.*)

"Seldom committing depredations in the poultry yard and rarely killing a small bird of any kind."—(Keys).

"Never have I known them to molest poultry."—(Preston).

"There were never any signs about the nest that birds or poultry formed part of the food of the young.—(Burroughs).

"Rarely kills birds and is distinctly a benefit to the agricultural interests."—(Roberts).

"It does little or no harm to poultry and but little to birds, except in the breeding season when it has young to feed, when it occasionally catches some of the smaller birds."—(Riley).

"Blacksburg, Va.—Principally mice, insects, frogs, etc., and occasionally small birds."—(Smyth).

"Howard Co., Md.—This morning, Dec. 30, 1889, my son, Mr. J. Murry Ellzey, surprised and shot a Broad-wing which had seized near the house a large Plymouth Rock rooster, which he had lacerated and almost denuded of feathers along the back, and certainly would have killed but for timely rescue, in a very few minutes. This is the second instance this season in which Mr. Ellzey has shot this species in the act of seizing poultry. At West River, some weeks ago, it appeared in greater numbers than ever before remembered and numerous complaints of its attacks upon poultry were made."—(Ellzey).

Doubtless there are a few individuals in a hundred thousand of this species, possessing the strength and spirit, and at some period sufficiently near starvation, to attack and kill a fowl many times its own weight, but the evidence here presented would scarcely convict. I know of several pairs nesting within sight almost, of several thousand domestic fowls, and in the twenty-two years I have known the species as a local breeder, never heard of it molesting poultry in any way. Prof. Ellison A. Smyth, Jr., of Blacksburg, Va., informs me that on May 18, 1906, a farmer brought him an incubating female and said it had a nest near his house. His wife claimed it was killing her chickens, so he shot it. Its stomach contained part of a young rat. Wm. B. Crispin, Salem, N. J., says it never molests poultry.

Samuels writes of an individual missing a red squirrel, then dash at and kill a white-throated sparrow—a feat worthy of one of the *Accipiters*; and Maynard relates at some length the movements of one which had killed and eaten an adult Brown Thrasher. Maynard was better acquainted with the species than Samuels, whom I suspect of not infrequently confusing his birds. I have an immature bird which was shot as it dashed in the midst of a flock of Red-winged Black-

birds; its stomach, however, contained grasshoppers and fiddler crabs. In a nest deserted by the lusty young, July 10, 1900, I found pellets and other evidence of the forbidden food: (1) hair, skin and jaw of wood mouse, interscapulars of a young Flicker, (2) feathers of a young Wood Thrush; the nests also contained the rectrices of one or two young Flickers. Dr. Mearns found no trace of feathers or other evidence of its feeding upon birds in the numerous specimens dissected. Banks found three unfledged Thrushes in a specimen taken in New Brunswick, and Swift a small bird too decomposed to identity, in an Elmira, N. Y., bird. Chas. C. Richards of Norwich Conn., notes that the Blue Jay, Oven-bird and other small birds do not mind this species in the least, and sometimes nest almost under the tree occupied by it, but never so near the *Accipiters*.

(*Buteo platypterus antillarum*), Grenada, W. I. "Lizards, rats, snakes, young birds, etc., and occasionally makes a raid on the poultry yard."—(Wells.)

St. Vincent, W. I. "In the stomachs of all specimens I examined I found the remains of lizards and snakes. The name by which this bird is known throughout the island (Chicken Hawk) led me to suppose that it was an enemy to chickens. I never observed it molesting poultry. A female was feeding on one of the enormous earth-worms common in those parts."—(Lister.)

(*B. p. rivieri*), Dominica, W. I. "Eats lizards as well as small birds."—(Ober.)

"In several of the specimens taken, the stomach contained nothing but large caterpillars."—(Clark.)

Returning to *B. p. platypterus*, Henshaw states that its bill of fare includes snakes, toads and frogs, but not many mice and very few birds of any sort; and Allen found portions of two or three garter snakes in a nest containing two young ready to fly on July 22, 1898, in New Hampshire. J. H. Fleming informs me that one of the nesting birds of Emsdale, Ont., had a large garter snake on May 18, 1897; and Chas. C. Richards writes that in going to a patch of

woods in Ledyard, Conn., Apr. 28, he saw a Broad-wing sitting on a dead limb overlooking huckleberry pasture and cultivated land. It was looking intently at something in the bushes, which proved to be a blacksnake at least five feet long. Doubtless the bird was waiting for the reptile to get clear of the bushes before tackling it. McIlwraith states that near the end of April or early May, it may be met with in the woods of Southern Ontario, usually sitting quietly on the lower branch of a tree near some wet place, watching for frogs; Bagg finds it in like situations on the shores of the little lakes of the Adirondack region, feeding to a considerable extent on frogs; one killed had two pairs of frogs legs in its stomach; and Sage states that all specimens examined at Portland, Conn., show that it feeds upon frogs.

The male apparently carries food to the sitting female. Henry W. Beers observed at Trumbull, Conn., May 12, 1903, a male perched near a nest with three eggs, with a fish in his claws; and John L. Calcord, New Vineyard, Me., flushed a female from her nest and eggs, May 30, 1905; the male came about carrying a wood mouse in his claws. F. B. Spauldings, Lancaster, N. H., May 13, 1898, found a nest of fresh eggs containing a dead snake about a foot long.

"It is fond of the larvæ (or caterpillars) of the big night-flying moths."—(Henshaw.)

"Have examined the stomachs of a good many and found principally caterpillars and grasshoppers."—(Kumlien.)

"In July, 1882, my nephew, Malcolm Storer, being at Moosehead lake, (Maine), had the curiosity to examine the stomach of a (Broad-winged) Hawk he had shot there, and was surprised to find that it contained a large number of caterpillars in all stages of decomposition through digestion. They were of greenish color, with yellowish ring or blotches, and were as thick and almost as long as a man's little finger."—(Storer).

"Minea, Sierra Nevada of Santa Marta, Venezuela. Stomach of specimens taken Jan. 17 and 22, 1879, were full

of large grasshoppers, spiders, etc."—(Slavin and Godman.)

"Western Ecuador. Dans l'estomac des chenille de lepidoptre, et des morceaux de blatte."—(Berlepsch and Taczanowski.)

"Gualequiza, Ecuador, male, fish scales, locusts, beetles and frogs."—(Sclater.)

"Making a specialty of the large caterpillars of the sphinx-emperor moths, such as the cecropia caterpillars so destructive to shade trees. This is one of the few birds that venture to attack these formidable-looking creatures."—(Weed and Dearborn.)

The young are well cared for and fed with insects or small bits of flesh soon after leaving the shell. F. H. Carpenter found a full grown red squirrel in a nest of small young, Bristol Co., Mass., June 14, 1901; and my own notes read as follows: June 10, 1906, freshly killed meadow mouse, and small pellet of mouse hair; young 8 days old. July 2, 1907, frequent pellets the size of the end of my thumb, of mouse hair and some bones; also bits of crawfish and a decayed wood mouse under several layers of leaves; young 22 days old. July 1, 1906, no pellets but numerous tufts of mouse hair; young 29 days old. July 23, 1901, large ground mole freshly killed, young 41 days old.

"The stomachs of four birds examined, one had just eaten a part of a rabbit, one a red squirrel, one a snake, and the crop of the fourth was filled with bones of young birds taken from the nest. I have several times seen this hawk catching grasshoppers, but never a mouse."—(Hardy.)

Clark says: "This hawk [*Buteo platypterus antillarum*] is a great plague to poultry raisers on St. Vincent, but on the other hand it is of use to the agriculturist, as it feeds largely on the mole-cricket, which, since the introduction of the mongoose and the consequent killing off of the large ground lizards, have increased to an alarming extent. I once took 18 of these insects from the stomach and crop of a single hawk."

RESULTS OF THE EXAMINATION OF TWENTY-ONE STOMACHS.

Linda, Minn., June 3, '93, female, sm. garter snake and bunch of hair, Benj. T. Gault.

Mt. Ephraim, N. J., May 12, '01, female, sparrow, phoebe, fledgling size of robin, Anna A. Mickle.

Raleigh, N. C., August 26, '89, male, 1 beetle, 1 green grasshopper, C. S. Brimley.

Raleigh, N. C., May 23, '88, female, mouse fur, C. S. Brimley.

Raleigh, N. C., May 23, '88, female, remains of crawfish, C. S. Brimley.

Troy, Ohio, April 27, '07, male, 2 toads, G. Clyde Fisher.

Wayne Co., Mich., April 23, '99, female, 3 sm. garter snakes, and beetles, J. Claire Wood.

Wayne Co., Mich., April 30, '99, female juv., 3 beetles, 1 crawfish, parts of mouse, J. Claire Wood.

Wayne Co., Mich., May 5, '07, female, 1 sm. garter snake, 1 hylla, 1 crawfish, J. Claire Wood.

Wayne Co., Mich., May 19, '07, male juv., 1 crawfish, J. Claire Wood.

Wayne Co., Mich., May 19, '07, female, 2 green frogs, J. Claire Wood.

Wayne Co., Mich., May 26, '07, male, parts of warbler, J. Claire Wood.

Blacksburg, Va., May 18, '06, female, parts of young rat, Ellison A. Smyth, Jr.

Ottawa, Ont., May 8, '09, male, large beetles, G. Eifrig.

Berwyn, Pa., September 1, '91, female, large green caterpillar, mouse hair, F. L. Burns.

Bradford Hills, Pa., April 16, '94, female, large bull frog, F. L. Burns.

Berwyn, Pa., Apr. 27, '05, female, field mouse, bull frog, F. L. Burns.

Salem, N. J., August 9, '05, male im., remains fiddler crab, 1 red-legged and 1 leather-backed locust, F. L. Burns.

Paoli, Pa., October 5, '06, female, May beetle larvæ, 3 red-l. locusts, F. L. Burns.

Berwyn, Pa., April 23, '09, female, 1 thousand-legs, F. L. Burns.

Defuniak Springs, Fla., June 23, '10, male, 2 or 3 grasshoppers and 1 katydid, G. Clyde Fisher.

Summary: Langdon, Warren, Fisher, Burns, et al. 115 stomachs examined; 11, contained birds; 31, mice; 17, other mammals; 17, reptiles; 22, batrachians; 45, insects; 10, crawfish; 2, spiders; 1, thousand-legs; 2, earth worms; and 7 were

empty. The Broad-winged Hawk has been known to have eaten the following species:

Lepus floridanus Cottontail Rabbit, (Fisher), *Lepus americanus*. Northern Hare, (Nap. A. Comeau), *Microtus pennsylvanicus* Common Meadow Mouse, *Microtus pinetorum* Short-tailed Meadow Mouse, *Evoiomyssapperi* Red-backed Mouse, *Peromyscus leucopus* White-footed Mouse, *Mus musculus* House Mouse, *Mus norvegicus* Norway Rat, *Arvicola austerus* Wood Mouse (Langdon), *Tamias striatus* Chipmunk, *Sciurus hudsonius* Red Squirrel, *Blarina brevicauda* Short-tailed Shrew, *Blarina brevicauda carolinensis* (Fisher), *Mustela noveboracensis* Common Weasel, (Keys), *Colaptes auratus luteus* Northern Flicker, (Burns), *Sayornis phoebe*, Phœbe (Anna A. Mickle), *Zonotrichia albicollis* White-throated Sparrow, (Samuels), *Passer domesticus* English Sparrow, ("C. C. F."), *Sciurus aurocapillus* Oven-bird, (Fisher), *Toxostoma rufum* Brown Thrasher, (Maynard), *Turdus mustelinus* Wood Thrush, (Burns), *Enmeceas* sp.? Lizard (Langdon), *Thamnophis sirtalis* Garter Snake, *Storeria occipitomaculata* Red-bellied Snake (Fisher), *Liopeltis vernalis* Grass Snake, *Natrix sipedon* Water Snake, *Bufo lentiginosus* americana Common Toad, *Rana clamita* Green Frog, *Rana pipiens* Leopard Frog, *Rana sylvatica* Wood Frog, *Hyla* sp.? Tree Toad (J. Claire Wood), *Ceratomia amyntor* Elm Sphinx larvæ (Fisher), *Samia cecropia* Cecropian Moth larvæ (Fisher), *Telea polyphemus* larvæ Polyphemus Moth (Fisher), *Lachnosterna fusca* Bay Beetle larvæ Polyphemus Moth (Fisher), *Lachnosterna fusca* May Beetle (King), *Tibicen septendecim* Seventeen-year Cicada (Fisher), *Melanoplus femur-rubrum* Red-legged Locust (Burns), *M. bivittatus* Two Striped Locust, *M. atlantis* Lesser Migratory Locust, Leather-backed Grasshopper (Burns), Thousand-legs (Burns). Black Spider, Dragon Fly, Black Ant (Case). Fiddler Crab (Burns), *Astacus fluviatilis* Crayfish, *Sitones hispidulus* Clover-root Cuculis (McAtee), *Lumbricus terrestris* Earthworm.

Voice.

This species is one of the most musical of its tribe. Its characteristic notes have been variously, though not always satisfactorily described. It may be that it is somewhat different in the various localities and that individuality occurs in some instances, or perhaps we do not all hear alike, at any rate the numerous interpretations are at variance. Samuels gives it as a shrill "Key, ky-ah, Ky-ah-Ke-ee." To Gentry it sounds like "Ke-ou." Reed, "Cree-ee." Job, a shrill

scream "*Whee-e-e-e*." Blanchan, "*Che-e-e-e-e*." Preston likens it to the Killdeer Plover and tolerably well represented by the syllables "*Chea-e-e-e-e*," sharp and piercing when the bird is angry or drawling and pitiful when an intruder comes too near the nest. Frequently he had almost decided to leave the humble parent in possession of her treasures, so pleading was she, and her attitude so indicative of sorrow. Jackson likens its voice to the grating of a large door on its hinges, and Reed to the creaking of branches. Abbott describes it as a rather prolonged, mellow whistle that is pleasing and very different from the cat-like scream of the Red-tail; Minot who was not very familiar with the species, thinks it not unlike the familiar cries of the "Hen Hawks." Burroughs calls it the smoothest, most ear-piercing note he knows of in the woods. Mearns calls it a squealing note.

In Minnesota it sounds like "*Siggee, siggee*," something like a Killdeer, a Rose-breasted Grosbeak or the alarm cry of a Red-winged Blackbird to Currie; while Peabody hears a shrill shriek of "*Tig-g-e-e-e* *tig-g-e-e-e*" that stirs his blood. Widmann describes it as a piercing "*Ré ee*," and it sounds almost exactly like the whistle of the Killdeer to Ralph, which agrees with the description given by Riley "*Kill-e-e-e*." According to the latter's experience this cry is never given in a hurry or in quick succession. It might with propriety be called the nest call, as he has never heard it except in the vicinity of a nest. White also favors the Killdeer note. Wintle heard it utter a note very much like a Cowbird. The manuscript notes are almost as widely at variance. A. C. Bent describes the bird whistling her characteristic note, so different from that of any other hawk "*Kwee-e e e e e*," a shrill whistle on a high key, long drawn out, plaintive and diminishing in force. The Red-shouldered occasionally utters a somewhat similar note, but on a lower key and not so prolonged. He also heard a "*Ker-weee e c e e*" uttered by a bird sailing over the tree tops. Henry W. Beers and Harry S. Hathaway think squealing describes its notes better than whistling, and the latter has heard the East

Greenwich, R. I., birds give the Killdeer Plover call several times; he describes the usual cry as "K-a-nee." Prof. Ellison A. Smyth aptly terms it a whining whistle. The Rev. P. B. Peabody lately describes it as "T'-e-e'-e-e." This note is often heard while the bird is on the wing, which gives the note, under this circumstance, a softened ringing timbre.

The Florida bird utters a shrill "*Chip-pe*" with pronounced accent on last syllable, according to R. W. Williams. It has also a subdued note that is so accurately reproduced by the Florida Blue Jay, that one is often mistaken for the other until the bird is seen. E. F. Pope of Colmesneil, Texas, says it has a habit of circling high overhead and uttering its rather plaintive note of "Zigee-e." John E. Thayer calls its cry Phoebe-like. Dr. Fisher tells us that one of its notes resembles quite closely that of the Wood Pewee. I have noticed the similarity, however, the first syllables are not alike and the whole lacks the penetration in the instance of the last named species. With the Broad-wing it is a subdued and plaintive "*Che-wee*" or "*Che-wee-e-e*." When mating or locating for the season, it lazily skims through the air just above the tree tops, uttering a frequent metallic "*Chu-e-e*," which, unlike the former and more domestic note, is perhaps not wholly a whistle nor more than a suggestion of a scream. Once when a captive was harried by a band of Grackles, and again when a female was disturbed repeatedly at its nest containing small young, I heard it utter a peculiar harsh distressed cry "Ka-Ka-Ka-Ka." Owen Durfee once only, detected a difference in the notes of the sexes. May 21, 1904, at Lancaster, N. H., that of the female presumably, being more raucous, and that of the male more shrill. I have noticed it in a pair found nesting May 12, 1907, near Berwyn. The female flushed from the nest and perched in a nearby tree, the male soon appeared from an opposite direction and his "*Che-wee-e-e-e*" was answered in ten seconds by the female on the near side of the ravine; if she failed to reply in the allotted time, he waited ten seconds longer and whistled again, and she replied after about the

usual interval; a single whistle sufficed, it was not repeated until after the regular period. The whistle of the male was an octave higher always. The female loomed up large and light in the clear sunlight, without leaves to obstruct the view, as I passed almost directly under her.

Chas. C. Richards likens it to the Wood Pewee's last syllable, longer drawn out, tone between Wood Pewee and Killdeer. He has heard its note when it sounded almost exactly like a young Beetle-head's (Black-breasted Plover), as it came back to decoy after one of the flock had been winged. In one instance where the second egg was very small and doubtless the bird aged, it had a cracked whistle on the last of the note. Full note "Peeo-we-e-e-e." Male different from female. Knight gives it as a shrill whistled "Ku-e-e-e." It is worthy of note that Dr. Coues found the young captive Swainson's Hawks, a closely related species, uttering a "peculiarly plaintive whistle to signify hunger or a sense of loneliness, a note that was almost musical in its intonation. The old birds have a harsh scream," and the Verrills state that the note of their newly described *Buteo tropilis* Tropical Buzzard of San Domingo, resembles that of *B. platypterus*. Ober states that the Dominican form of Broad-wing, *B. p. rivieriei*, courses above the valley uttering its cry of "mal fini fini."

Enemies.

Man is the chief, and it may be said with almost equal truth, the only deadly enemy with which the Broad-winged Hawk has to contend. Some years ago I noticed a fine specimen nailed in the prevailing spread-eagle fashion to a barn door at Paulding's bridge, within a stone's throw of the Bakewell estate where Audubon captured his first example. I thought that if this was a lineal descendant of that historic bird, inheriting a portion of its peculiar disposition, the hunter responsible for this one's death had no great reason to feel proud of either his marksmanship or woodcraft.

Every person possessing a gun seems to take a peculiar delight in persecuting this and all other species of the *Rap-*

tores. Truman Yarnall, a sporting Quaker of Willistown, Chester Co., Pa., made the killing of hawks an especial hobby. His method was simply to ride up within short rifle shot, which he could easily do on horseback; dismount, pass his arm through the reins and adjust the sight—about this time his horse would toss his head, anticipating the report of the gun, usually eliciting an impatient “I do wish thee would be quiet!” from his master. I am informed that he killed 130 hawks in a single winter. Lancaster County, Pa., is agricultural to a fault, and J. Jay Wisler writes that the Raptories have a rough time of it; ornithologists, who might spread the gospel of protection, being few. J. Claire Wood reports that the local hunters of Port Austin Twp., Huron Co., Mich., spoke of having shot hundreds for sport in the annual spring flight; and at Point Pelee, Ont., a farmer sat in his front yard one afternoon and shot 56 without leaving his chair! (Taverner and Swales).

But from northern New Jersey come the most shocking reports of slaughter: “The sportsman who this season (1900) has done the greatest execution is J. Elmer Applegate, and he it was who expressed to 318 Broadway such a bunch of hawks as was probably never seen in this city before. So unique was the display that the birds were strung upon a line and hung outside of the show window facing Broadway, where, suspended by the heads in a festoon the birds attracted an enormous amount of attention from passing pedestrians.” “A flight very much in evidence on April 16. As usual Gil Spear was there to meet them, and he and two of his friends shot close to a hundred during the two days occupied in the passage.” Again, “J. P.,” writing for Shooting and Fishing, XXIV-XXVIII, 1898-1900, states that Hank White and William Little shot fifty the first day, and the next day when the main flight came along, the former and Howard Hance “killed 298 in all from largest to smallest.” C. H. Muirhead of South Amboy, writing for the same journal, states, “I remember after a morning’s shooting at Dad Applegate’s several years ago, we counted

more than six hundred dead hawks, and there were many more killed on the other side of the creek that were not counted."

Dr. Shufeldt, in commenting on the above, says: "People entertain terribly mistaken ideas about the part hawks—and owls too, play in nature. A great many farmers have a notion that there are but two kinds of hawks, a big chicken hawk and a little chicken hawk, both of which menace their prosperity by attacks upon the poultry yard. * * Greedy men! Doubly greedy farmer! * * It is said, and with truth, that they prey upon our smaller game birds—yes, and always to satisfy the instincts of hunger, and never simply for the sport of the thing, as men do all over the world."

Not content with the constant unorganized slaughter, many of our state legislatures have passed bounty laws from time to time in recognition of the supposed interests of the rural population. Rhode Island has been swept bare of breeding Broad-wings owing to recent "scalp act" and to the destruction of timber. Near Toronto, Ont., it seems to be decreasing, one woods usually inhabited, suffered badly from last year's fire and the ax (Eifrig ms.) In the vicinity of Tallahassee, Fla., it invites its own destruction in a manner which is characteristic of the species. Just as soon as one enters its haunts it sets up its shrill cry. It is only a matter of locating the nest-tree within the circumscribed area the bird has marked out (Williams ms.). Owing to the female's solicitude for its nest during the breeding season, it falls victim much oftener than the male. I believe most collections will show a marked excess of the former over the latter.

Disposition in the Presence of Other Birds.

It is not quarrelsome: as a rule it will dwell in peace with its neighbors. I have found crows nesting all around it in perfect harmony apparently: and was once almost mobbed, myself, while robbing a Broad-wing's nest, by a party of Fish Crows. Its comparative immunity from attacks of the semi-domesticated species, is doubtless due to its habit of confining

its operations within its natural bailiwick—the timber, swamp, and waste places. The few instances of disagreements that have come under my observation, are appended.

In common with the Buzzards, it is often teased by King-birds and Crows, but on such occasions shows a quiet dignity and unconcern, which is very striking.”—Minot.

“It seldom pursues other birds of prey, but is itself frequently teased by the little Sparrow Hawk, the King-bird or the Martin.”—Holmes.

“Though usually a sluggish bird, it will at times show considerable courage and dash at an intruder. I have noticed two such instances. Once while in a tree watching a Swallow-tailed Kite, a male Broad-wing Hawk which was guarding a nest, fought another bird of this species, driving and pursuing it a great distance. Then suddenly it turned back and almost struck me in the face as it came on with arrow-like swiftness.”—Preston.

Wilson lost the mate to the one he shot, because it was attacked and driven away by a Kingbird. R. P. Sharples writes me of a pair near West Chester, Pa., found in the same woods for a number of years until 1907, when they were driven out by a pair of Cooper’s Hawks, nesting in the next ravine. I have found the *Accipiter* and the *Buteo* dwelling amicably in the same neighborhood. A. C. Bent found the Crows making life miserable for a nesting bird, at one time three chased her; and on the other hand a nest found May 17, '08, at Rehoboth, Mass., was hardly 100 yards from that of a Cooper’s Hawk, and there was also a Red-shouldered Hawk’s nest within a quarter of a mile; showing that the three species can live in harmony as near neighbors.

John D. Currie found it nesting in close proximity to the Cooper’s Hawk, American Crow, Long-eared Owl and Black-crowned Night Heron. At Chester, Ct., J. B. Canfield found its nest within 100 feet of the domicile of a Sharp-shin; and Chas. C. Richards, Norwich, Ct., relates an instance of a pair of Broad-wings actually assisting a nesting Red-shoulder in her endeavors to scare the intruder from her nest.

Disposition in the Presence of Man.

Wilson, who secured the type specimen in Bartram's own woods, had little opportunity to study the bird's natural temperament. His specimen was secured but a short time before Audubon had taken the same species from a nest a few miles further up the Schuylkill. The former figured the male life size in a spirited attitude for his sixth volume of American Ornithology which appeared in 1812, while the latter drew the female early the same year; each unmindful of the other's great work in Nature's realm. In the exact language of Wilson: "It was perched on the dead limb of a high tree, feeding on something, which was afterwards found to be the meadow mouse, figured on Plate L. On my approach, it uttered a whining kind of whistle, and flew off to another tree, where I followed and shot it. . . . It seemed a remarkably strong built bird, handsomely marked, and was altogether unknown to me. Mr Bartram who examined it very attentively, declared he had never before seen such a hawk. On the afternoon of the next day, I observed another, probably its mate or companion, and certainly one of the same species, sailing about over the same woods . . . I was extremely anxious to procure this also, if possible; but it was attacked and driven away by the Kingbird before I could effect my purpose, and I have never since been fortunate to meet with another." The date was May 6th, 1812. Audubon's account, though verbose, is full of interest: "One fine May morning, when nature seemed to be enchanted at the sight of her own great works, when the pearly dewdrops were yet hanging at the point of each leaf, or lay nursed in the blossoms gently rocked, as it were by the soft breezes of the early summer, I took my gun, and, accompanied by my excellent brother-in-law, William G. Bakewell, Esq., at that time a youth, walked toward some lovely groves, where many songsters attracted our attention by their joyous melodies. The woods were all alive with the richest variety, and, divided in choice; we kept on going without shooting at anything, so great was our admiration of every bird that presented itself to our view. As we crossed a narrow skirt of woods, my young companion

spied a nest on a tree of moderate height, and, as my eye reached it, we both perceived that the parent bird was sitting on it. Some little consultation took place, as neither of us could determine whether it was a Crow's or a Hawk's nest, and it was resolved that my young friend should climb the tree, and bring down one of the eggs. On reaching the nest, he said the bird, which still remained quiet, was a Hawk and unable to fly. I desired him to cover it with his handkerchief, try to secure it, and bring it down together with the eggs. All this was accomplished without the least difficulty. I looked at it with indescribable pleasure, as I saw it was new to me, and then felt vexed that it was not of a more spirited nature, as it had not defended itself or its eggs. It lay quietly in the handkerchief, and I carried it home to my father-in-law's, showed it to the family, and went to my room, where I instantly began drawing it. The drawing which I then made is at this moment before me, and is dated 'Fatland Ford, Pennsylvania, May 27, 1812.' I put the bird on a stick made fast to my table. It merely moved its feet to grasp the stick, and stood erect, but raised its feathers, and drew in its neck on its shoulders. I passed my hand over it to smooth its feathers by gentle pressure. It moved not. The plumage remained as I wished it. Its eye, directed toward mine, appeared truly sorrowful. I measured the length of its bill with the compass, began my outlines, continued measuring part after part as I went on, and finished the drawing without the bird ever moving once. My wife sat at my side, reading to me at intervals, but our conversation had frequent reference to the singularity of the incident. The drawing being finished, I raised the window, laid hold of the poor bird, and launched it into the air, where it sailed off until out of my sight, without uttering a single cry, or deviating from its course."

Incredible as Audobon's account may seem to many, due allowance being made for the embroidery of retrospection, it is no doubt true in the main. There are times when individuals of the most timid or the most wary species may be approached and handled, especially during the most critical period

of incubation. Nor is his experience altogether unique; I have perfectly authentic evidence of a similar instance in recent years. I regret that my correspondent has withdrawn its publication at this time.

"I have always found it cowardly, and to evince no disposition to repel an invasion of its nest. It would seem, however, that the disposition of this bird under certain circumstances is very variable. Mr. A. G. Boardman, of Maine, who has found several nests, and secured the eggs, finds it to be courageous and spirited. A man whom he had employed to obtain a nest, was attacked with great fury, while ascending the tree; his cap was torn from his head, and he would have been seriously injured if the bird had not been shot. Another instance is mentioned by Dr. Wood, where the hawk had attacked a boy climbing to her nest, fastened her talons in his arm and could not be removed until beaten off and killed with a club."—Warren.

"Last summer, when in company with the Bangs brothers at Tyngsborough, I noticed a small hawk perched on top of a dead stub in a wood. While I was endeavoring to obtain a shot, it flew a short distance, alighting in a spot where I could not see it, but I continued to walk in the direction it took and, after going as far as I thought it had flown, stopped to examine the branches of the trees, when I was surprised to see the object of my search, sitting on a low limb a few yards away, gazing quietly at me."—Maynard.

"They are gentle in disposition and never attempt to strike a person, although they are very solicitous about their eggs and young. For days after they have been robbed, these birds will utter their complaints when anyone approaches their homes."—Ralph in Bendire's *Life Histories*.

"One day while stationed in a tall larch [N. W. Minn.] watching a pair of Swallow-tailed Kites which were nesting not far away, a Broad-wing seemed much disturbed at my presence. Perching himself on top of a dry larch, within easy gunshot of me, he kept up a continual cry, screaming forth his shrill *e e e*. Now and again he darted by me so close as to fan me with his wings; then he resumed the same perch where

he poured forth his doleful strain. This was the first attempt at resistance I had witnessed, as when frightened from the nest, the female will fly heavily away a little distance and remain among the tree tops, an anxious witness of the collector's depredations."—Preston.

"The collector does not have to reconnoiter around two or three hundred yards to get a shot at a Broad-wing, but can walk deliberately up to within easy range and collect his bird. Last summer, one allowed me to approach so near him that I killed it with a stone from a sling.' They are beyond doubt the least suspicious of any of our hawks."—Cantwell.

Edward J. Kimes, Canton, Ohio, relates another instance of the consuming curiosity of the bird. On Mar. 27, 1910, when it was approached along the edge of a wood in the hope of a nearer view, it flew slowly out and above him at the height of the tree tops and then leisurely back again, alighting face about and scrutinized him closely, this was repeated three or four times.

At Middletown Springs, Vermont, during the autumnal flight of 1904, one was caught on a fence close to a house. The people watching, unintentionally attracted its attention while a boy crawled along the fence and grasped it by the legs. This sounds unreasonable, but never-the-less it is a fact told me by the boy and by his father who saw him do it; both are well known to me and reliable. I saw the hawk, which showed no signs of having been kept in captivity. It never became at all tame and was given its liberty before winter.—W. S. Hickox *ms.*

Philo, Ill. A boy brought me one which he says allowed him to knock it off a limb with a ten foot stick. Last year I kept a wounded one captive until his wound healed. He became a model pet and when a week after I released him in Lynn Grove, he allowed me to catch him again, I felt that he had not forgotten me.—Isaac E. Hess *ms.*

In North Carolina it is a little tamer than the other *Buteos*, C. S. Brimley *ms.*; and at Tallahassee, Florida, it appears

timid and spiritless, yet it selects a nesting site in the close vicinity of man.—R. W. Williams, Jr., *ms.*

At Gualaquiza, Ecuador, Sclater registers it as exceedingly shy; while Lister found the form now known as *B. p. antillarum*, at St. Vincent, West Indies, very bold in defense of its young and unlike the Black Hawk, very tame and permits a near approach.

We may call the species tame, stupid, cowardly, spiritless, anything that may seem to imply lack of energy, courage or enterprise; but nevertheless it has retained its independence of man, and as man's hand has cut off its more enterprising competitors, it has quietly filled their places without attracting attention by dashing boldness nor injurious habits.

Disposition in Captivity.

"In the spring of 1871, a nest was built in the woods adjoining my house, from which I took one of the young birds. It became a very interesting pet, quite gentle, and fond of me, but refused to submit to being handled by anyone else; but it was prone to wander abroad, and so was lost."—Mearns.

"Unlike *lineatus*, it is a very disagreeable and surly pet, indignantly refusing proffered food. It maintains the unenviable disposition for nearly a week, when being sorely pressed by hunger, and seemingly convinced that escape is hopeless, it ultimately becomes reconciled to its condition, and learns to come at the call of its master, and even to accept food from his hands. In the presence of strangers, it manifests marked reticence, and instantly repels any attempted familiarity."—Gentry.

"Side by side with *Accipiter cooperi* I reared a *Buteo pennsylvanicus* of about the same age (probably two weeks). The fierce aspect of the *Accipiter* showed itself quite early, and indicated by its every action, its rapacity and daring. The *Buteo*, on the other hand, was mild in appearance and never exhibited the fierceness nor voracity of the *Accipiter*. But I succeeded better in petting the latter. It seemed to grow rapidly fond of my company. The *Buteo*, however, neither ex-

pressed pleasure, nor showed displeasure upon my coming near it, though it would make itself felt when one attempted to handle it. It never, however, used its claws with the same spirit as the *Accipiter*. I could handle the latter with impunity after it grew to know me. Strangers, it fought with spirit and resisted all their attempts at familiarity. The *Buteo* regarded all alike, seemingly neither as friends nor foes."—Roddy.

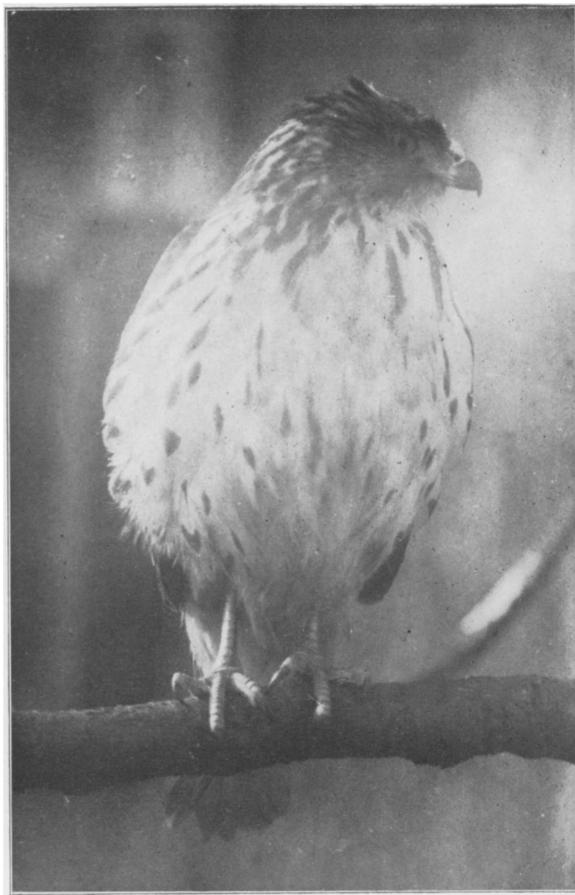
"A trio of fledglings, which came into my possession, devoured almost everything offered them, even cooked beef. It was really amusing to watch them. One, who was the strongest, asserted his powers by gathering everything to himself, at which he was kept very busy, as his weaker nest-mates would slyly purloin a portion, even at the risk of a flap over the head. They were always quarrelsome and never satisfied."—Preston.

"They were very noisy and resented being handled very much, though among themselves, good nature prevailed." (Three young 3-4 weeks old.)—Shufeldt.

We kept a family of four young for two weeks or until three had disappeared one at a time down the throat of the largest. He was a regular cannibal—Isaac E. Hess *ms.*

Some ten years ago we took one from a nest and kept it several years in a cage in the yard (winter in the basement.) It was not at all wild when one approached the cage and took food out of one's hand. It knew all those that belonged to the house. When a stranger entered the yard it always uttered its "*perwee*," but never when one of the family entered. It was as good as a watch dog and was particularly loud when a beggar came sneaking around the house into the back yard when he had to pass his cage to go to the kitchen door.—O. Widmann *ms.*

My first captive was a female raised from the nest. I had named it "Buteo." When three months old I considered it quite as able to take care of itself as if it had the teachings of the parent. At this age it frequently uttered the single syllabled "flight" cry, harsher at the end, and which I interpreted as the hunger cry, as it was perched upon or just above the feed-



BROAD-WINGED HAWK (*Buteo platypterus*)

Juvenile "fluffed out" to resist cold wind. Nov. 30, 1907
(Photographed by Alfred C. Redfield)

ing board, evidently waiting to be fed. The fat of beef, or mutton was invariably rejected, beef liver and lights, toads, fish, the body of an owl, and tainted meat were not to its liking unless it was very hungry. Large, fat, corn-fed meadow mice and fresh, warm sparrows appeared the favorite food, though any species of mouse or mole, rat, skunk, rabbit, squirrel, kitten, puppy, chicken, snakes, frog, lizard, turtle, crayfish, insect, and scraps of raw beef were eaten eagerly. Live food was preferable to dead food, always; and anything larger than a young rat usually had to be slit up the breast to enable it to get at the flesh. In all the years I kept this and others captives, not a drop of water was consumed directly. This bird would occasionally hop awkwardly about the ground snapping at flies and bugs. Two or three meals daily, after it had attained its growth, seemed to keep it in good condition. If a meal was occasionally dropped, it would often be hungry enough to blanket the first few morsels, from which I infer that this action relates more intimately to an instinctive fear of being robbed of its food than to timidity of being observed; however, it always absolutely refused to eat in the presence of any one but myself. When desperately hungry it would carry a bit of bone, wood or any foreign object it could gather from the ground to its feeding board; or a bit of rabbit skin was plucked free from fur and the skin eaten. By the third week in September when its brethren were retiring southward, it attempted to obey the "call of the wild," refused to eat and beat ceaselessly against the wire of its enclosure until its cere was bleeding and forehead bare of feathers. A small, dead viper afforded it some lively amusement, and though it had probably never seen the like before, it displayed an instinctive caution in disposing of it. Stretching head and neck to ascertain what sort of food it had before it, it instantly sprang upon the reptile, catching it in its left foot, and with poised wings, whirled around with raised right foot, evidently eying its prey for a possible strike; as usual with all prey, its head was first torn off and eaten. The quickness of the bird is wonderful, now and then it strikes my fingers before I can throw the food upon the stand, and the

other set of claws fly out like a flash to secure the prey falling from the board. Its grasp is painful and not easily loosened, though it will ordinarily rest harmless on my extended hand and playfully nibble at my fingers.

When five months old its actions gave the lie to the oft repeated assertion that the species was given to cowardice. One foggy morning a skunk harboring peacefully under one of the buildings, attempted to dig its way into the enclosure, doubtless tempted by the scraps dropped from the feeding board: the hawk sat as motionless as an owl, directly over the place where the animal's paws sought entrance, prepared to spring upon its bulky visitor. My scientific researches did not include a possible disablement of my pet nor the pollution of the atmosphere, besides I kept a box tortoise in the cage to act as a general scavenger, which duty it performed to my satisfaction; and I was not sorry to have the skunk retire before any damage was done. One or two days later, our cat, an immense tom, climbed to the top of the cage out of curiosity perhaps, and with sinewy yellow paws extended through the wire mesh, excited the hawk to an upward attack, flying against the wires much to the cat's discomforture. On Nevermbeer 15, I placed it in its winter quarters in the barn loft and the next day discovered that it had escaped by dashing against a window sash, dislodging an 8x10 glass, a sufficiently large opening to afford an exit. It apparently roosted in a spruce in front of the house, and the next day I discovered it twenty-five feet up in a maple across the road. Shooting a couple of English sparrows, I threw them on the snow near the tree and tried to coax it down. In response to my whistle which always meant food, it flew lower and again dropped a few more feet, but reconsidered the matter and retired to the former position. Toward evening it retired to the evergreens on my neighbor's place; again and again I almost had my hands on it only to have it take wing in the peculiarly exasperating manner of a half-tamed pet. The third day it came down to the line fence, being unable in its half-famished condition to make headway against a very high wind, though it fought its captor savagely.

Captivity had unfitted it for the strenuous life, and the deep snow prevented it picking up anything at all; returned to its old quarters in a highly excited state, it nevertheless broke its fast very willingly

This hawk's eyesight appears better in the dark than most diurnal birds, it was enabled to pounce upon and devour a bird thrown near it, long after twilight in the gloomy loft. When it was about seven months old, I gave it a five days fast before introducing an ancient Bantam rooster, which it refused to touch, so I placed the fowl to roost upon the pole alongside of it that evening and the next day removed the chicken. Ten days later the Bantam was again placed on a bench within three feet of the hawk. *Buteo* observed it intently for awhile and then deliberately walked over, giving it such a clout with its claws that the rooster set up a despairing cackle as it scuttled to the far end of the bench, while the hawk retired to its first position. Again *Buteo* advanced with outstretched neck and raised crest, little Dick believing his time had indeed arrived, made a great outcry, but the hawk took wing flying backward and forward over him, making a downward feint just above the ancient creature, time and again, adding to his alarm without doing any harm; and another day found him without injury. Meat, however, was growing scarce, the English sparrow no longer came upon the place, the enforced fast of the hawk sometimes extended for days together and the bantam constantly underfoot in the stable, so in February I found *Buteo* perched upon the dead body of the little fowl and seemed quite proud of its feat in bringing down such bulky game. It was an unfortunate kill, however, and resulted in the hawk's own death a few days later

My second captives, taken in 1907, were of opposite sex, designated Nip and Tuck, the latter being the male as found later, developed an altogether untamable disposition. I was compelled to wear gloves when handling them, and even then was occasionally cut through the leather. Strange to say, neither one uttered the characteristic whistle throughout the following winter and not until April 30, 1908, when about

nine months old, though chattering excitedly whenever I came near. A young Screech Owl was an inmate of the flying cage for several hours without being molested. The species penchant for snakes was again shown in the actions of Tuck when a house adder was admitted. He ran along the entire length of the shelf in a curious springing gait, with extended neck; the reptile was immediately seized and the head torn off, al-thought the bird had just been fed. Each bird had its favorite perch and feeding place. Tuck was found dead Sept. 27, 1908. His body was unusually large for a male's and layers of fat were found under the skin and about the intestines. Nip lived through three spring and summer moults and would probably have survived a long time but for my inability to provide a sufficiently varied fare. Lack of change from beef lights without doubt contributed to the development of fainting fits upon the least excitement. She would fall upon her back with half-spread wings, flutter desperately for a short time and then lie motionless and stiff until I feared it was death. For about four months she was subject to this and finally I found her dead beside the body of a hen I had given her the day before from which she had been unable to tear a single morsel, September 19, 1910. This hawk was peculiarly fond of live catfish

Migration.

VERNAL—The more or less abundant migratory species of the Hawk tribe in North America (especially the *Accipiters* and *Buteos*) representing considerable areas of the more northern breeding grounds, apparently migrate in convergent lines and fairly consistent routes. These routes are as natural and as prone to error as the highways and bypaths of man. To all appearances, they simply follow the paths of least resistance as though not endowed with wings, following the coast line, river valleys, coursing around high elevations and large bodies of water, or crossing at the narrowest point. The flights are not so often what might be termed flocks, but rather a steady increasingly abundant stream of independent units at a height

varying from easy gunshot to or beyond the power of human vision. Social instinct being largely wanting, this migratory segregation is rather the inevitable result of a simultaneous crowding at the "fords or causeways" affording the most favorable passage; for remarkable as it may seem, these fierce, strong-winged birds of prey are adverse to crossing large bodies of water.

My data tends to the conclusion that the vast bulk of migrating Broad-wings ascend the Mississippi valley, distributing its quota near the mouth of every river valley. Natives of Minnesota and Manitoba region have a comparatively simple journey after entering the United States, but the vast horde pouring into the Ohio valley enroute for Ontario, Quebec and possibly northeastern United States and southeastern Canada, have a more intricate and fatiguing journey. As few, if any, migrants appear from the West Indies, the Gulf States must receive their supply from the Mississippi valley also; and the Atlantic States from North Carolina to Pennsylvania and New Jersey, overland from Tennessee, Cumberland and possibly Ohio valleys. More complete data may show a South Atlantic coast migration, of which I have no hint.

The arrival of the transient before the summer resident would seem to indicate that the more northern bird did not winter so far south as the latter. No doubt the vast flight trains originate in the leisurely forward movement of the van, until the constantly increasing hosts accelerate the leaders to swifter flight in order to reach a field less open to competition. Sennett observed fifty or more Broad-wings on the lower Rio Grande, April 11, 1878. According to E. F. Pope, it does not winter at Colimsneil, Tyler Co., Texas; arriving about the middle of March and from then on seldom out of sight or hearing. It usually makes its appearance in southern Louisiana about the end of March (Beyer, Allison and Kopman); and Andrew Allison states that he has not seen it in winter in Mississippi, arriving about April 1, not earlier than March 20; and at Woodbine, Coosa Co., Alabama, Aretas A. Saunders first records it in 1908 on March 25 and it soon became abundant. It is

rather irregular in Missouri, seldom seen in March, oftener in early April, but summer residents cannot be expected with certainty before the latter part of the month (Widmann.)

Mixed flocks of Red-tailed, Red-shouldered, Broad-winged and Cooper's Hawks were encountered in Iowa, April, 1862, when "hundreds slowly sailed over in the peculiar gyrating manner of these birds. They formed a long loose flock, extending both to the northward and southward as far as could be seen, the whole company occupying more than an hour in passing a given point" (Allen).

The earliest during 16 years' observation by Dr. I. S. Trostler in Douglas and Sarpy Cos., Nebraska, was April 1; yet H. E. Lee noted a flock of 15 on the Missouri River at Pierre, Douglas Co., South Dakota, Mar. 25, 1906. Preston mentions the many pleasing freaks of flight as the great company moves onward in the regions of the Red River of the North. Geo. E. Atkinson finds it early in May regularly, his first or earliest record being May 1, 1897, at Portage la Prairie, Manitoba.

On April 27, 1892, a flight of hawks which lasted all day, was observed at Chicago by Dunn. At one time in an opening of a small woods called Hog island, 14 birds were in sight. Most of them appeared to be medium-sized, perhaps one-fourth were small. Mr. Craig shot one of the latter which proved to be a Sharp-shin, and Mr. Dunn shot two of the former which were Broad-wings. They were rather tame, several alighted among the trees. They were all flying south or perhaps S. W., while the woods was full of other birds migrating northward. The day was warm and pleasant, with light thunder showers in the morning and the wind south, strong.

J. Claire Wood writes that along the Port Austin shore in Huron Co., Michigan, there is an annual spring flight. The local hunters spoke of shooting hundreds for sport and Arnold met with flocks there while after Eagles' eggs in April. They follow up the shore of Saginaw Bay. The village of Port Austin is separated from the extreme north point (Point Aux Barques) by two miles. more or less wooded and he could get no information from this point but believes they crossed easter-

ly into Ontario. In Wayne Co. he finds it most common during the latter half of April and early May when all the way from singles to two or three hundred may be seen at one time, always circling high in the air and gradually working northward. The earlier birds are all or nearly all adults and the majority from the middle of May to June are birds in the plumage of the second year. Few adults alight in the county, but many of the junior do so and some remain in suitable localities, until the middle of June. At Detroit he has seen more of the birds passing over the city than elsewhere (probably from more frequent opportunity) but they do not seem to be concentrated at any special point along the river, and all cross into Ontario. Detroit is practically at the head of Detroit river and while this hawk is rare north of the city limits (Lake St. Claire), it is more or less common on the south side (Detroit river). He believes that the bulk of the S. E. birds work N. and E., and the Michigan examples are all from the eastern Mississippi valley.

Swales gives the time of arrival in southeastern Michigan, as late April and early May. Norman A. Wood gives four dates for Ann Arbor, the earliest being April 15, 1905, and the latest May 25, 1897.

For Oberlin, Ohio, Baird gives March 1-10 for the earliest arrival based upon ten years records, while Jones gives about the middle of March for same localities. Prof. Jones gives a very interesting account of several flights witnessed by him near Cedar Point, Ohio, (which lies nearly opposite Point Pelee, Ontario). The two most conspicuous of these flights were May 2, 1904, when a large company, associated with 6 Red-tailed, 4 Red-shouldered, 3 Rough-legged, 3 Sparrow, 2 Marsh Hawks and 2 Bald Eagles, were watched from the top of a sand-stone knoll two miles south of Oak Point. The Broad-wings disappeared to the N. E., but all the others returned apparently to their nesting places. The other occasion was April 29, 1907, at Rye Beach, when the numbers were too great to be counted. These Broad-wings were near the ground when first seen, but rapidly ascended in spirals, all the while

moving nearly parallel to the lake shore in an easterly direction. When they disappeared from view high up they were still drifting eastward over the land. In this company there were Sparrow, Marsh and Rough-legged Hawks, four of each, which did not accompany the Broad-wings far. When the birds were first seen they were about two miles west of the east end of the marshes, and therefore within plain view of Kelley's Island. It seems likely that they had arrived over the Sandusky River route, and therefore reached the lake shore, or the marshes near Sandusky. It is difficult to account for their easterly course if, as it seems almost certain, they were bent on reaching the Canadian side. At their elevation of several hundred feet they must have been able to see not only Kelley's, but also Pelee Island, and probably also Point Pelee, Ontario.

Eaton of Rochester, N. Y., confirms the story of the incredible number of hawks passing each spring along the southern shore of Lake Ontario and toward the east over the country south of the lake, evidently making their way around its eastern end toward the north. The height of these migrations occurs during the latter part of April and the first week in May. The birds are mostly Sharp-shinned and Broad-winged, with a sprinkling of Marsh and Pigeon always present, but surprisingly few Cooper's Hawks. At a time when the Red-tailed and Red-shouldered Hawks are nesting in western New York, it is surprising to see many of these species also soaring high in the air and wheeling toward the east. When the wind is high the hawks fly low, with less circling; the Sharp-shinned lowest of all. The writer was surprised to learn how many of the migrants were Broad-winged Hawks and states that they were certainly a conspicuous part of the procession, from April 21 to May 17.

J. H. Fleming writes me that near Glenwilliams, Halton Co., Ont., May 4, 1910, from the top of the ridge behind the quarry, he saw about a dozen Broad-wings high up over the ravine, later they descended, flying east, on or about his level along the ravine, then mounting and circling until at the

west end of the ravine, when they again came east, repeating this as long as he remained. The hawks were all in full plumage and afforded a close view as they passed on the near side of the ravine.

McIlwraith states that in southern Ontario, toward the end of April or early May, should the weather be clear, great numbers are seen soaring at a considerable height and moving in circles toward the northwest. It is a regular transient at Toronto and Fleming says that mature birds are rare. G. R. White informs me that it arrives at Ottawa about the 28th of April; and the Rev. G. Eifrig records it at the same place on April 24, 1908; also at Inlet, Labelle Co., Quebec (which is 50 miles northeast of Ottawa), on April 25, 1905. At Godbout, Quebec, Nap. A. Comeau finds it a very common migrant, apparently not nesting much along the coast line, but directing its flight further north. The bulk of the northern migration is about the middle of May.

Cairns stated that it arrived in Buncombe Co., North Carolina, about the end of March and C. S. Brimley finds it at Raleigh about the middle of April. The earliest record, March 20, 1896, in the vicinity of Berwyn, Pa., was made under peculiar conditions. The bird was found clinging with outstretched wings and tail to the leeward end of a cord of firewood, during a great wind storm, and was utterly unable to breast the gale. A. K. Pierce writes that it usually arrives at Renova, Clinton Co., Pa., the second week in April.

"J. P." commenting on the vernal flight of hawks which is of yearly occurrence near New York city, says in 1890: Much of what was learned was due to the expert knowledge of the late Hank C. White, of Red Bank, N. J. . . . These hawks follow certain well-known courses on their passage north. This course seems to follow along the whole sea coast of New Jersey until Sandy Hook is reached. The birds, upon reaching Sandy Hook refuse to cross the lower bay, but double back, and passing the highlands of Navesink, strike inland. One of the most favored spots has been for

years at Morgan's station, a place where Cheesquake creek flows into the lower bay. It was a few miles further to the southwest of Morgan's station that White stationed himself each spring, and remained there day after day, until the very laggards of the flight had passed along. . . . Since the preceding lines were written I have learned that the flight of hawks which passes northward over what is known as the Crow's Nest, a prominent height to the westward of the semi-mountain overlooking Mountclair, was very much in evidence there on April 26. Ordinarily nearly every variety of hawk known is found in this annual flight.

In 1898 the same sportsman writes: The flight this season commenced the last Saturday in April. The first saw the vanguard straggling along one after another at slow intervals. The next day found the main body in full advance. The birds do not come in flocks; instead, it is a continuous current of birds, one following another with the regularity of clockwork and the precision of machinery. The greatest number ever seen at one time this year was ten, and these separated at about equal distances. Why they should follow the coast line is a puzzle. On the other hand, why should the birds leave the coast at one particular point and turn inward? To my certain knowledge this has been the case for thirty years past. The spot where they make this detour inland is a little south of Atlantic Highlands and over what is known as Mount Mitchell. If by chance a few of the birds pass that point and fly along the coast until Sandy Hook is reached, they invariably turn back and make use of the usual passageway. Possibly the birds are daunted by the long width of the waters of New York bay. Another thing that impresses one is in the fact that the returning flight southward in the fall does not take this direction. The movement is only in the spring time.

The birds fly in a straight line over the spot where the men locate themselves, and, with the exception of the larger birds, show no fear in their approach, even when the shooter stood out perfectly unconcealed. The big fellows appear to

be more wary, and these will make a detour to one side or the other from where the men stand. The little and medium ones come right along in straight line, the fall of one when shot disturbing not a whit the fellow in line behind it. Asking White how many he thought passed along on that day, he answered that he had not the slightest idea. It was a continuous stream of birds without a moment's cessation from daylight to the time the sun went down.

Muirhead also writes from the same locality: The idea is popular here (Cheesquake creek, South Amboy, N. J.) that the hawks fly in the wake of other species of migrating birds, which they overhaul and feed upon. We never have good hawk shooting unless all conditions are favorable—wind westerly and brisk. If there is little or no breeze the birds pass over high, most of them out of range. The reason given for seeing the hawks here when on their northern flight is explained in this wise: The wind must have been westerly for a day or two, and far enough inland to incline most of the birds in its area toward the ocean. When they come to this they resist the wind enough to keep them over the beach, and so string out along one after another until they come to Sandy Hook; then seeing nothing but water ahead, they change their course, following the beach up Sperm City cove and Raritan bay, and then continue their flight overland again; that is, those that escape, for many are killed.

"J. P." has already intimated that the flight occurs inland as far as Montclair, N. J., and (Karl V. S.) Howland, in 1873, says the hawks begin to pass through Montclair on their way north in the latter part of March. Since then he has shot specimens of the Red-tailed, Red-shouldered, Sparrow, Cooper's, Sharp-shinned, Broad-winged, and American Osprey. Randolph H. Howland, in answer to a recent inquiry from me, states that no large flights of the Broadwings have been observed by him, although he has seen the bird in small groups, namely: a flock of 7 on Apr. 18, and 5 on May 9, 1905; and 11 on May 13, 1906. At Hartford, Conn., Sage gives the average date of arrival as Apr. 10-

20; and in Maine by Knight as early in April. Wm. Wood, East Windsor, Conn. (Am. Naturalist, V, 1871, p. 759-60), informs us that in 1856 his attention was called to twenty or more hawks—species not stated—that were diving, screaming and going through various gyrations high in the air, and passing to the N. E. in the early spring. Early in April, 1860, a similar migration was witnessed, when the number in sight at one time was about fifty. About the last of March or first of April, 1870, a friend of his observed a flight, when the air seemed filled with diving and screaming hawks passing northward and seventy were counted in sight at one time. In all of these flights they were not in flocks according to the common acceptance of the word, but were in pairs or groups of about four usually. Rev. Job states that about the middle of April or later there is sometimes witnessed a great flight, especially of the Broad-winged Hawk. Along the Housatonic Valley, in Conn., he has seen loose squadrons of them. Dr. Allen mentions flights at Springfield, Mass., for several years quite regular in appearance, in autumn as well as spring.

Locality	Yrs. observ.	Av. date.	Earliest date.	Latest date.
Lexington, Ky.	2		Apr. 18, '05,	May 7, '04.
Chicago Vic.	8	Apr. 22,	Feb. 11, '97,	May 5, '00.
Lorain Co., O.	7	Apr. 17,	Mar. 13,	May 10,
Toronto, Ont.	11	Apr. 22,	Mar. 6, '97,	May 13, '99.
Ottawa, Ont.	4	Apr. 29,	Apr. 24, '08,	May 19,
Pierre, S. Dak.	2		Mar. 25, '06,	Apr. 12, '07.
Tolma, No. Dak.	2		Apr. 4,	Apr. 20
Winnipeg, Man.	1			May 3, '05.
Edmonton, Alb.	1			May 8, '03.
Philadelphia Vic.	12	Apr. 14,	Mar. 1, '04,	Apr. 30, '05.
Princeton, N. J.	3		Feb. 7, '06,	Apr. 22, '07.
Franklin Co., Me.	11	May 1,	Apr. 14, '96,	May 28, '06.

AUTUMNAL.—The retrograde movement can be traced in the east through Rhode Island, Connecticut, southeastern New York, northern New Jersey, eastern Pennsylvania, and Maryland and Virginia, when it is lost. No general movement in the middle west south of the Great Lakes appears. The Canadian contingent does not utilize the various passages between these large bodies of water to any extent as

far as I have been able to obtain information; doubtless many cross the St. Lawrence and join the eastern flight of mixed species, and probably many take the westerly course until Wisconsin offers an unobstructed passage south. At Godbout, Quebec, Napoleon A. Comeau writes that the return or southern migration is in the first week in October. Some years it is very abundant. This was especially the case in the fall of 1904, when hundreds were seen daily. In the migrations it flies high and nearly every one keeps to the same line of flight. J. H. Fleming noted a flight along the ridge north of Toronto, Ontario, Sept. 21-22, 1905; and various writers report flights of regular occurrence in the province.

A visitation of Bread-wings occurred at Middletown Springs, Vt., in the fall of 1904, but W. S. Hickox informs me that it did not compare to the invasion of Goshawks in the fall of 1906. Dr. Shufeldt, commenting on the large mixed flights of annual occurrence in Connecticut, says: "The latter part of October is a good time to see it, especially after there has been a sharp frost or two. Any high, cleared land is the locality to be sought, and if the movement is on and the day clear, one will soon be struck by the number passing. They do not fly very high as a rule, and here the trend is westward, while after they arrive on the Atlantic coast the flight is southward. They seem to pay but very little attention to objects below, and one may shoot at them all day without very materially changing position. On they come, flying in undeviating files, and often the individuals not more than five or ten minutes apart, or even less. They come at random, regardless of kin or kind, and they keep coming until the sun goes down."

In certain sections of Rhode Island, according to Dunn, large flights of hawks may be seen during the latter part of August, and through September and October, whenever there is a stormy N. W. wind. They seem to follow the coast, as three miles back from the shore only a few stragglers can be found. Specimens of the Marsh, Sharp-shinned,

Cooper's, Goshawk, Red-tailed, Red-shouldered, Broad-winged, Duck, Pigeon and Sparrow Hawks were obtained. H. S. Hathaway writes me that quite a few are shot for the bounty offered by the state during the fall flight in September, which follows the southern shore.

At Bay Ridge, Long Island, Wilmot Townsend observes: "I have not seen them save on the annual flights, which occurred very regularly each autumn, Sept. 24 to 27. I say *occurred*, for I have not observed them for some years past, —say five or six, the neighborhood being all built up and the birds finding no place to halt, have largely deserted us. I remember the flight of Sept. 27, 1892, was marked by the unusual number of Broad-wings that appeared, circling as is their habit, by hundreds, high in the air. It was a very unusual flight, both as to numbers of various species (Broad-wings predominating) and as to weather conditions, Temp. 53°. Wind light N. N. W., with high barometer and a crystal sky."

Trowbridge has given a great deal of time and attention to this phenomenon. He informs us that "at New Haven, Conn., Sept. 16, 1887, there occurred another great flight of hawks, and I was again fortunate enough to witness it. There was little wind at first, and the hawks did not appear until nine o'clock in the morning, when a few Sharp-shinned Hawks were observed. But later on the wind increased in force. Thousands of hawks of different species flew past, and Broad-winged Hawks, both adults and young, appeared soaring in immense clusters. In one great flock alone there must have been 300 hawks, the greater part were undoubtedly *Buteo platypterus*, although with field glasses I distinguished several species in the flock, one week later, on Sept. 24, after a number of days of southerly winds, there occurred a flight which lasted from six o'clock in the morning until noon. I was informed by several collectors, who were out shooting at the time, that three flocks of Broad-wings passed over them, and they were able to secure a number. Sept. 18, 1890, when a large flight occurred, the day

was warm and partly cloudy, but there was a light breeze from the N. W., and there had been southerly winds for a long period previous, which seemed to show that the south winds had temporarily checked the migration of the hawks. During this flight, the hawks flew higher than usual, but I observed two immense flocks of Broad-wings, and I saw several of them shot down, together with Sparrow, Sharp-shinned and Cooper's Hawks, all of which were plentiful. Sept. 20, 1893. Few hawks noted this date. Obtained two Broad-winged, a Sparrow and a Pigeon Hawk. Sharp-shins were very abundant. Sept. 21, early in the day there appeared a flock of about 25 Broad-wings circling low over the city. I hastened out and soon stood in a position favorable for observation, where I saw hundreds of them and secured eight beautiful adults with the greatest ease. I even took a selection of plumage, as the birds passed a few yards overhead, battling against the strong wind which blew from the N. W., as they flew along the coast."

Trowbridge's List of Hawk Flights, which have occurred in Southern Connecticut During the Years 1885-1894:

Date.	Weather.	Wind.	Broad-winged Hawk.
Sept. 22, 1886.	Clear.	N. W., light.	Abundant.
Sept. 16, 1887.	Clear and cool.	N. W. very strong.	Great flight all day.
Sept. 17, 1887.	Clear and cool.	N., light.	Abundant early in morning.
Sept. 24, 1887.	Clear and cool.	N. W. to N., strong.	Abundant also <i>A. velox</i> .
Sept. 18, 1890.	Fair and warm.	N. W., light.	Abundant.
Sept. 20, 1893.	Clear and warm.	N. W., mod. fresh.	Abundant.
Sept. 21, 1893.	Clear and cool.	N. N. W., very strong.	Great flights.

Willard says its numbers are most noticeable at Utica, N. Y., during the months of July and August, when the appearance of so many in the air at a time, one might consider it a very abundant bird; and Barbour of an extensive flight at Lake Minnewaska: "The birds were in most cases circling, sometimes sailing straight forward, beating of the wings being extremely rare. As, in clear weather, the birds were very high, and in bad weather the light was very poor,

I will not insist too strenuously upon my identification of the hawks as Broad-wings, but I am substantially certain. The flocks were moving, in the main, from N. E. to S. W., but parts of some of the flocks turned off to the west. They were accompanied, or followed, occasionally, by Red-shouldered; once or twice, apparently, by Fish Hawks; twice by Marsh Hawks, and once by an Eagle. The flocks seen by me then, numbered as follows: Sept. 15, 30; Sept. 16, 15; Sept. 17, 11 and 30; Sept. 20, 35, 35, 50, 66, 10, 23, 50, 15, 40; Sept. 21, 30." He also publishes a letter from Kirk Monroe, who observed the same phenomenon at the Ice Caves of the Shawangunk mountains, near Ellenville: "Sept. 18, the forerunners were a few stragglers that only caused comments by their undeviating and unhesitating southward flight. These leaders were, however, quickly followed by other birds in ever increasing numbers until the marvelous flight extended as far as the eye could reach to the eastward; and upward to a point when the great birds appeared no larger than sparrows. When the hawks first aroused curiosity by their numbers, one of my companions undertook to count them, but having counted 50 in less than one minute, he gave up the attempt, and was glad to have done when, at the end of an hour the incredible flight still continued without pause, or diminution. I cannot venture even to guess how many hawks passed above us during that time; but know that they numbered well up among the thousands. I would add that three days after encountering this remarkable flight, I witnessed another of the same character, only this time numbering but two or three hundred individuals, taking the same southerly direction over Sam's Point, but a few miles from the caves visited on the previous occasion." Sixty miles S. W. of Ellenville and Lake Minnewangunk, N. Y., in Sussex Co., N. J., von Lengerke has observed for a number of years the migration of thousands of hawks. He says: "On Sept. 22, '07, the number exceeded any ever observed before. I was on the top of a mountain near Stag Lake, about 1200 ft. above sea level. I

was armed with a Hensoldt binocular eight power glass. The day was clear, and at one time late in the forenoon, several thousand hawks, Broad-wings mostly, were in view. They came from a northeasterly direction. A constant stream, very high up, could be seen for a long while, and they were going in the direction of the Delaware Water Gap. Over the valley to the S. W. the birds seemed to collect into an immense flock, while hundreds, if not thousands, of birds were gyrating around and around; describing smaller and larger circles in the air, in height of from, I should judge, 600 to 2000 ft. above the earth. Most birds were Broad-wings. There were, however, other hawks, such as Red-tails and Red-shoulders among them, while the *Accipiter* genus was represented by some Cooper's and more Sharp-shinned, which, however, were mostly flying lower and took no part in the general evolution. Some days I have observed about every species of hawks that we find in this part of the country, from the same stand. The most extensive migrations occur just before a storm." Horsfall adds his observations while at Shawnee, Pa.: "The line of flight for hawks, and also other birds, such as Crows, Black-birds, Nighthawks, etc., was down the west side of the Delaware river just below the crest of the hills, until reaching a point about two miles above the Delaware Water Gap, when they would invariably rise over a low corner of the hills and pass on to the S. W. by W., going north of the Kittatting mountain range. No birds were observed to go through the Gap, though I would not say that none do."

Randolph H. Howland observed at Upper Montclair, N. J., a flock of 5 on Nov. 29, '04, and 8 on Aug. 30, '05. (Karl V. S.) Howland records at the same place, Sept. 18, 1893, 37 shot from three blinds on Orange mountain, and others seen. The most common were the Broad-winged and Sharp-shinned Hawks. Babson mentions large flocks of the Broad-wings migrating high in the air, over Princeton; and Philip Laurent that he never at any time found the latter common, although he saw a flight of the Pigeon Hawk,

some sixteen years ago on Five Mile Beach, which at that time was not the summer resort that it is today. He saw at least 50 birds in the air at one time, and they were working southwest.

Leonard Pierson reports a flight of 15 at Wayne, flying S. W., between 2:30 and 4:30 p. m. Sept. 25, '07.

William B. Evans saw a flock or about 30-50 individuals on Sept. 13, 1905, between Clifton and Burmont, on the P., B. and W. R. R., Delaware Co., Pa.; and extensive migrations of unidentified hawks occur near Berwyn, but at so great a height few are reported. The Red-shouldered Hawk, which does not summer with us, outnumbers, ten to one, any other species coming to earth at this season. I am informed by H. Justice Roddy, that he noted in Sept., 1888, while at a signal station on top of Pilot Knob, Perry Co., Pa., a great migration of the Broad-wing. He counted not less than 1000 individuals moving S. E. An occasional Cooper's and Red-tailed Hawk accompanied the flight.

J. H. Riley, Fall Church, Va., has upon one or two occasions seen a dozen, probably more, during a day's shooting late in the fall, and always supposed they were migrating, as they were nearly always flying toward the south. Rev. G. Eifrig noted, near Cumberland, Md., Sept. 21, '01, 11 a. m., a flock of about 25 circling in a very picturesque way over Will's run. The circles of the several birds had different centers, but overlapped more or less. Fine sunny day, no wind. Ellzey mentions the extraordinary number of hawks, Broad-wings predominating, during the fall of 1889, in Howard Co., Md.

Prof. Ellison A. Smyth saw a flock of 14 in pairs, and in threes and fours, but nearly all in sight at once, near Blacksburg, Va. All were flying very high toward the S. W. They would stop and circle for a minute or two then continue until all had disappeared.

Scott quotes Atkins to the effect that on Oct. 21, 1887, he saw at Key West, Florida, a large flock of hawks, 150 or more, mainly of this species. Andrew Allison says that it

gathers in small flocks for migration, together with the *Ictinia* in late summer, and usually all are gone from Mississippi by Sept. 1.

Taverner and Swales, who have made extensive observations on Lake Erie at the southernmost point of Canadian mainland, Point Pelee, Ont., inform us that it arrives about the last of August, but does not appear in any numbers until the main body comes down with the Sharp-shins. Even then not more than a dozen have been seen at any one time—Sept. 18, '06. Keays listed but three in Sept. '01. Later, B. H. Swales writes me that as yet no spring records, but in the fall he has found the birds in small numbers from Aug. 20 ('10) to Oct. 14 ('06). The birds cross the lake in sight of the chain of islands extending to the Ohio shore. J. Claire Wood has observed no autumnal flight in Wayne Co., Mich., even when the southward movement is at its height in September, not more than 6 or 7 birds are seen in a day, and more often none.

At Portage la Prairie, Manitoba, George E. Atkinson reports that about the middle of August the young and fall plumaged birds are noted commonly about the city. It seems more affected by low temperature than the other hawks and leaves usually in September. Hatch states that it departs from Minnesota about Sept. 1. Kumlien says it sometimes appears in Wisconsin in immense flocks, many hundred can be seen at one time, remembering one such flight in 1871, when he killed six at a single discharge. At the time of the autumnal flights they are very fat and seem to be principally young birds. Later Kumlien and Hollister state that this migration seldom lasts but a day or two and is of irregular occurrence, and the flocks are invariably of this species alone.

In Missouri, Widmann finds the migration from the north brisk during the fourth week in September, when on some days dozens may be seen sailing over in loose flocks. It does not stop over as long as the Red-tail and Red-shoulder, but small parties may be met with during the first half of

October, after which it becomes rare, though the last may be noted a month later (Nov. 11, '97, Keokuk-Currier). He informed me that on Sept. 22 and 23, during a little migration at Washington and New Haven, Mo.—55-65 miles west of St. Louis, on the Missouri river: 20 were seen on the forenoon and afternoon of the 22nd and 9 at 8:30 a. m. on the 23rd. They went south soaring at a considerable height, but the light being good the color of the underparts, especially the two whitish bands on the tail, could be plainly seen, and together with the general contour, made identification easy. (There was also a migration of Cooper's Hawks going on). Broad-wings do not winter in Missouri; all are gone by the end of October.

Irving H. Wentworth writes me that they arrive from the north about the first week of September and remain until early spring, frequenting the heavy timber in "bottoms" and along streams, in Kendall Co., Texas.

Locality.	Yrs.	Observ.	Av. date.	Earliest date.	Latest date.
Franklin, Me.	4	Sept. 27,	Sept. 12, '04,	Oct. 7, '05.	
Montclair, N. J.	3	Sept. 26,	Aug. 13, '05,	Nov. 29, '04.	
Princeton, N. J.	2		Oct. 31, '07,	Dec. 9, '06.	
Philadelphia Vic.	4	Sept. 14,	Sept. 1, '92,	Oct. 5,	
Toronto, Vic.	7	Sept. 18,	Sept. 11, '03,	Sept. 28.	
Edmonton Alb.	1		Sept. 5, '03,		
Chicago Vic.	6	Sept. 10,	Aug. 9, '98	Oct. 4, '94.	
Tolma, N. Dak.	2		Sept. 10,	Oct. 20,	

Station.

Blanchan says: "No retreat is too lonely for these devoted mates, that ever delight in each other's company. While its range is wide, it is locally common in few places and rare in others, a lover of wild, unvisited regions." Reed states: "Some localities seem to have a strong attraction for them, particularly heavy pieces of woodland, and near some lake or pond, and they return to the same place year after year." Willard has found that it is found in some numbers in all upland wood tracts," while Ralph, writing of same locality, says it is "the Hawk of the Adirondack wilderness, and it replaces in this locality the Red-

tailed and Red-shouldered Buteos, which are so common in the smaller woods of the more settled parts of this state. I think that with the exception of the Pigeon Hawk and Goshawk, which probably breed here also but are very rare, they are the only Hawks that nest in the interior of these woods, but along the borders they are sometimes found breeding in the same situations as the more common species. They are very fond of living near water in close proximity to the lakes and streams which are so numerous in the Adirondack region. The smaller lakes especially are favorite places of resort, and when a pair takes possession of one they apparently hold it against all intruders of their kind." In Minnesota, Preston graphically describes the "hidden retreats, where the tangled wilderness of lakes and forests guards in lonely silences the streams which feed the Red River of the North, I found the Broad-winged Hawk breeding abundantly. At home with the Barred Owl, and unmolested by stealthy tread of wildcat or lynx, he is in this region indeed a 'bird of the wilderness.' He chooses the heavy, close woods about small lakes, where food is abundant and shelter near, and where he may hide himself."

In Ontario, "unlike the Red-shouldered Hawk, it is partial to the thick swampy woods near a creek" (Macoun). Bendire says it is "most often found in the more extensive woods near water and in swamps, and much less frequently in the more open and cultivated sections." While Gentry finds "it prefers high open woods and waste grounds chiefly of a marshy nature, seldom venturing near human habitation."

In the vicinity of Lancaster, N. H., a mixed growth of woods seems to be preferred, and many times, trees beside small streams are chosen for the nest. Rarely is the bird seen away from the woods in which its nest is located, during the breeding season; and it is very much attached to its old nesting haunts, returning for several years in succession (Spaulding ms). In the western part of Bristol, Co., Mass., where the prevailing heavy timber consists of hardwoods,

its chosen haunts are in the more remote and largest tracts of medium-sized chestnut and oaks, usually in high and dry woods. In Bristol and Plymouth counties, it is a quiet, retiring, forest-loving species, and for that reason may be easily overlooked. I have never seen it circling high in the air and screaming as both the Red-tailed and Red-shouldered Hawks are wont to do, and almost never see it except in the breeding season, and then only in the deep woods. Although it breeds on the average a month later than the Red-shouldered, it frequents practically the same localities (Bent ms.).

In Fairfield Co., Conn., its persistancy of nesting is not so marked as with the Red-shouldered, and my experience is rather at variance with other writers in this respect. It prefers to take rather open situations for nesting, and very frequently the nests are located close to where woodchoppers have just finished off chopping (Beers ms.). About Norwich, Conn., the nest is generally found near the head of a small ravine; if a brook runs through it, from brook to quarter way up hill. Any little gullies in outskirts of heavy timber near a pond hole or where the ground is fairly clean; and when the above conditions do not exist, not over 75 yards from the edge of the woods and near a cart road. Whichever location is selected, nest will be within sight of water and near farms, never in a wilderness. My experience is that it never travels far, and I have not seen one half a mile from its nest (Richards ms.). At Stephentown, N. Y., the nesting sites are all in the vicinity of water, swamps, small streams or ponds, and often close to wood roads, wood paths or little openings in the woods, or near edge of large tracts, not far from open pastures or meadows. These nesting sites were all mixed woodland, in which hemlock or pines were well represented (Hoag ms.). Near Auburn, N. Y., a nest was built near the edge of a quite heavily timbered small swamp, perhaps 20 acres in extent, having standing water. The principal growth of trees were elm and black ash; on the west and S. W. sides of the swamp was upland.

timbered with beech and maple (Rathbun ms.). Four or five pairs are known to nest near West Chester, Pa., year after year. The nest is always in the deep woods, and as it is not built until the leaves appear, it is not so apt to be seen as the nests of the earlier hawks (Sharples ms.). In Pennsylvania it haunts the wild rocky wooded ravines above the small streams and close to small ponds and swamps. While it is not unknown to the large grove, it loves the continuous woods over which it can pass undisturbed and unseen from one feeding ground to another; shunning the cultivated area altogether or traversing it only to visit some nearby swamp or pond (Burns ms.). Near Washington, D. C., it departs from its usual habit, selecting rather open timber probably because heavy timber is scarce near the District (Riley).

In Florida it was found in the center of 50 acres woodland (Williams ms.).

In Illinois and Missouri it prefers small woodland areas, or groves, of some few acres in extent (Smyth, Jr. ms.).

Near Edmonton, Alberta, a nest was located in the dense woods, and was found by the bird calling when close at hand (Stansell ms.).

In the vicinity of Minneapolis, Minn., there seem to be more Broad-wings nesting than any other place I know of. The country is wooded with hardwood, slightly rolling, with some high hills and considerable bodies of water. There are a good many marshes also, and low places, and in and around such places I always found it nesting invariably in thick woods of good-sized timber, near the edge, with a free sweep in one direction. Three or four nests were in tamarack swamps where the water was a foot deep during nesting time. Every year I could count on finding the nest of each pair that I knew, usually within half a mile, at the utmost of last year's nest. One nest which was within ten feet of a highway but in thick woods and invisible from the road in summer, was used three times with an interval of one year between each using. With rare exceptions I found only one pair nesting in each piece of timber and always

within a few hundred yards of water, and in fact many times right on the bank of some water (Currie ms.).

The single nest found near Omaha, Neb., was in a woods half a mile distant and 150 feet above the Missouri river, near the crest of a ridge (Shoemaker ms.).

In Tyler Co., Texas, it is confined exclusively to the oak ridges in the dry pine woods, at least I have never found a nest in any other kind of locality (Pope ms.).

The ideal station, and I refer to a definite existing locality in S. E. Pa., would seem to be a tract consisting of upland, hillside and swamp, well covered with mixed hardwood timber, with here and there an unoccupied clearing, an unfrequented public highway, cart road or path, with room enough for the silent deadly swoop after the unfortunate mouse or red squirrel; also a small stream or pond, in the shallow reaches of which it can snatch the crayfish, and surprise the frog or trout-eating water snake on the borders of the pools. The verdant foliage supplies it with numberless insects and fat larvæ. As it sits upon one of its favorite perches, well hidden by a leafy screen, should a chance human intrude, it cranes its neck and utters its plaintive whistle, which the uninitiated attributes to the cry of one of the numerous small woodland birds or the creaking of two opposing branches in the wind. Fortunate indeed is the nature student who is familiar with the Broad-winged Hawk in its home.

Mating.

I believe this species frequently if not always mate for life, but unfortunately direct evidence is wanting. Circumstantial evidence in the way of certain peculiarities of situation, nest building and material, individuality of the shell markings, etc., may apply only to the female. However, the fatalities constantly occurring in the ranks of the adults, and the yearly accession of the increase, make the business of mating fairly brisk, though so seldom reported. The birds are then positively noisy, and very restless. That keen oologist, Preston, reporting from the small tributaries of the Red River of the

North, Minn., states that "during the mating season (which begins about the first week in May), the clear, shrill screams constantly echo in the dim woods, as one answers back to another from some chosen perch." Rev. Peabody observed "at the margin of a field, a pair copulating, the male swooping down upon his mate as she rested lightly in a sapling top." Mearns, Cantwell and Swales have found the adult mated to an immature, in one or more instances.

SITUATION OF NEST—Almost every variety of forest tree has been utilized at one time or another, but the most abundant or characteristic species of the locality is apt to be the favorite. In central Alberta it is found in birch or poplar. In the vicinity of the Muskoka lakes, Ont., Spreadborough always found its nest in the large black birches; while White found it to prefer a hemlock or swamp ash near Ottawa, and Young of the same Province, states that the black or yellow birch seems to be the favorite. In Maine, New Hampshire, and Vermont, yellow birch is used more than all other species of trees combined, and as one collector writes, most of them are pretty difficult to climb. In the western part of Bristol Co., Mass., it seems to prefer to nest in chestnuts, though there are numerous groves of white pine. In the eastern part of Bristol Co., and Plymouth Co., where the large tracts of heavy timber are principally white pine and where chestnuts are rare or almost unknown, it nests almost invariably in the pines, though oaks are frequently available (Bent. ms.).

In Rhode Island, Connecticut, New York and Pennsylvania, chestnut is the favorite, with more than an occasional beech, hemlock, oak, maple, birch, or hickory. Babson of Princeton, N. J., found the several nests which came under his observation, to be in low oaks. Renova, Clinton Co., Pa., the oak, maple, black birch and chestnut are chosen, never an evergreen (Pierce ms.). Fleetwood, Bucks Co., Pa., all have been in chestnut trees (Liebelsperger ms.). In Chester Co., Pa., it has a strong preference for the chestnut (Sharples ms.). Shufeldt describes a nest in Maryland, near Tacoma Park, fifty feet up in an ill-shapen oak with short crooked limbs, in

a rather open piece of woods of some extent, and near the hilly bank of a small stream. One nest in Putnam Co., West Virginia was in a tall hickory (Morgan ms.); and another near Blacksburg, Montgomery Co., Virginia, was in an enormous white oak, fully seventy feet up; the main trunk about five feet in diameter (Smythe Jr., ms.). Virginia and North Carolina nests have usually been found in pine, maple, oak, chestnut, tulip poplar and magnolia; and Florida birds seem to prefer pine with an occasional magnolia. In the middle west or Great Lakes States, it seems to be uncommon enough as a breeder to have developed no marked preference; but in Minnesota, Preston found it in the basswood, elm, oak, and larch. Cantwell says small red oaks are favorites and others have found it in oaks, poplar, beech, maple, pine and walnut, with the oaks and basswood the favorites. Dresser states that it nests high up in cottonwoods almost inaccessible, on the Colorado in Texas, and at Colmesneil, Tyler Co., Tex., it seems partial to large red oaks and as a rule doesn't place the nest very high up, one nest however, was sixty-five feet up in a pine (Pope ms.).

On St. Vincent, West Indies, Lister says of *Buteo platypterus antillarum*, that its nest is often built in a bread-fruit tree; and Clark states that it is usually placed in a large tree, often a bread-fruit or cabbage palm. While on Grenada Island, Wells has found its nest on the fronds of the palmetto, and on large trees like the silk-cotton (*Ceibra*). Verrill states that *B. p. riviei* of Dominica builds a nest of sticks, grass and trash in high trees or on cliffs.

The nest is usually placed in the many-forked crotch of the main stem, which not only forms a secure base but also often the substantial supporting timbers of the rudely constructed home. Sometimes it is placed on several small branches against the trunk, an old nest of some sort furnishing the foundations usually. Rarely is it found well out on a forked branch away from the main hole. Preston mentions one in a drooping branch of an elm on a steep bluff, 30 feet above the Pelican river, Minn., which was visited at risk of life and

limb; and another instance near Fairfield, Conn., May 14, '89, by a pair very much attached to the home site on Heatherstone hill, built 45 feet up and 12 feet out from the body of a large white oak (Hamlin ms.). A set was taken by Forge in Manitoba from the top of a stump 30 feet high (Jackson ms.). The height from the ground varies from 3 feet in the broad-forked bole in Minnesota as recorded by George Cantwell, to the 87 foot oak of Delaware Co., Pa., essayed by Harry G. Parker, and the 90 foot black ash of Kalamazoo, Mich., made famous by Dr. Gibbs.

One hundred and sixty-seven nests in the Canadian and Transition zones average 33 feet from the ground, the west averaging 10 feet less than the east. Massachusetts much lower than those of the heavy timber of New Hampshire and Connecticut. Manitoba and Minnesota not infrequently exhibit nests at altitudes of 10 feet. In the upper Austral zone, 112 nests average 40 feet; and 12 nests in the lower Austral zone average 49 feet. Occasionally we hear of some inaccessible (Swales, Wayne Co., Mich.; N. G. Wood, Ann Arbor, Mich.; Smyth, Blacksburg, Va., all in large oaks; and Fleming, Emsdale, Dist. Parry Sound, Ont., in large tamarack).

Owen Durfee writes me that at times, it uses a flat platform on the top of a branching stub and this seems to be more of its choice for a site in the heavier timber on the Connecticut coast and in the northern woods. In this case, when the tree branches evenly making a flat platform, the nest will often have barely enough sticks on its circumference to keep the eggs from rolling out. At such times it is difficult to locate the nest, if elevated, unless the bird is seen leaving it. Chas. C. Richards describes a nest 70 feet up in a big hemlock, made of hemlock sticks and twigs, almost invisible from the ground. Harry S. Hathaway and John H. Flanagan found a singular nest containing a runt egg, May 13, 1906, in Rhode Island. It was 15 feet up in a red maple, the nest was about as large as the sitting female, and had the appearance of having lodged in the forks formed by a limb about $1\frac{1}{2}$ inches in diameter growing almost parallel with the trunk of some 6 inches.

Doubtless verbose accounts of the adventures of collectors are out of place in a paper of any scientific pretensions, but it seems almost a crime not to chronicle the accomplishments of some one of that nervy and self-reliant class known as field oologists. Calvin L. Rawson, the famous "J. M. W.," than whom there does not exist a more genial writer; says few sports are more dangerous, and no work more exhausting than long hard climbs to the nests of rapacious birds.

I here record the species of trees used by the Broad-wing as nesting sites, according to their popularity: *Castana dentata* chestnut, *Quercus* sp. oak, *Pinus* sp. pine, *Betula lutea* yellow, or gray birch. *Acer saccharinum* sugar, hard or rock maple, *Fagus americana* beech, *Betula* sp. birch, *P. strobus* white pine, *Q. alba* white oak, *Q. velutina*, *Q. rubra* black oak, *Q. prinus* chestnut oak, *Tilia americana* American linden or basswood, *Tsuga canadensis* hemlock, *Populus grandidentata* poplar, *Hickoria alba* hickory, *H. ovata* shellbark, *A. saccharinum* white or soft maple, *Q. maerocarpa* burr oak, *A. rubrum* red maple, *Magnolia virginiana* magnolia, *B. lenta*, *B. niger* black birch, *B. populifolia* white birch, *Populus deltoides* cottonwood, *Fraxinus niger* black or water ash, *F. americanus* white ash, *Q. petulstris* pin oak, *Ulmus* sp. elm, *U. fulva* red elm, *Juglans niger* black walnut, *J. cinerea* white walnut, *Picea* sp. spruce, *Populus candicans* Balm of Gilead, *P. pennsylvanicus* wild cherry.

Nidification.

CONSTRUCTION AND COMPOSITION OF NEST—During the often protracted period of hesitation as to the availability of the various nesting sites, the former nests are visited and the birds are quite noisy, but soon after the site is selected by the female, silence is observed and both sexes assist at nest building, gathering the dead sticks from the ground, carrying them to the tree in their talons. Chas. C. Richards saw a male with a piece of bark about 4 inches long in one set of claws, at right angles with his body, fly toward the nest from the south, while at about the same time the female appeared from the



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BROAD-WINGED HAWK (*Buteo platypterus*)

Position of nest. Rehoboth, Mass., May 20, 1906

(Photographed by Owen Durfee)

east with a small stick 4 to 6 inches long, in the same position. The species is a very crude builder and prefers to utilize an old structure of the crow, hawk, or squirrel, if the situation is favorable, rather than build the foundations itself; though not infrequently it does so, dropping more or less material at the base of the tree. Love for a former home will often influence it to return to a former site in a few years, even after every vestage of its former nest has disappeared. G. M. Allen has recorded a pair at Intervale, N. H., which nested for several seasons in a large beech. The nest was a high pile of sticks, evidently the accumulation of years. Rarely, however, it will occupy the nest of the previous year, either using it as a foundation for a new structure, or pulling out the old, re-line it. F. E. Newberry gives an instance of a nest of a Red-shoulder robbed at East Greenwich, R. I., and a Broad-wing taking possession after removing the old lining. The period of construction is oftentimes protracted, but too much curiosity leads to the desertion of the location and no time of its duration can be given. An occupied and newly built nest taken by me at Berwyn, May 13, '99, was found to contain the following material: 20 white oak twigs, 6 to 10 inches long; 26 chestnut twigs, 4 to 16 inches; 50 chestnut oak twigs, 5 to 16 inches long and many-branched; 77 dead sticks probably principally chestnut; 2 chestnut blossoms, 46 chestnut bark scales, 1x2 to 2x6 inches; and a few leaf sprays. It was placed upon a foundation consisting of a Crow's nest, from which it was separated.

Dead sticks, twigs and pieces of bark principally, occasionally corn husk, bits of moss and live twigs of any easily obtainable variety of tree; lined with a quantity of rough bark scales from the trunks of the chestnut, oak, maple, beech, balsam spruce, hemlock, pine or birch, according to locality, only one kind being used in a nest; often a few green twigs of the spruce, poplar, hemlock, fir or red cedar are added; more rarely, strips of inner tree bark, or red cedar, wild grape vine or pine bark, or bits of moss, usnea or lichen-covered bark may be used; and in two instances (Mass., N. J.) pine needles, and

in one instance (Florida) chicken feathers, formed the lining in part Audubon, followed by Brewer, Zadock Thompson and Holmes, and later by Gentry, Goss, Hatch and Dugmore; have stated that the nest is lined variously with strips of bark, rootlets, moss and feathers of the domestic fowl. Lining of this nature appear more characteristic of the Red-shouldered Hawk, and the error probably originated with Audubon taking the description at second hand from his brother-in-law or from the fact of the nest being profusely feathered by the moulting female.

Entirely new nests have better and more bulky appearance than the old patched up ones. In Central America, Salvin and Godman found no marked difference in the nest, roughly made of sticks, with a lining of bark and a few live twigs, sometimes built very near the ground. The Grenada bird builds a large bulky structure of dry sticks, according to Wells.

An almost invariable custom of the Broad-wing is that of placing sprays of fresh green leaves and sometimes blossoms, of the chestnut, oak, poplar, maple, wild cherry, basswood, cottonwood, elm, pine, spruce, hemlock, balsam, and in one instance, evergreen vine and swamp grass, in the nest, under and around the eggs or young; seldom more than one kind of leaf used in the individual nest, though it is frequently renewed. The sprays are broken from the tops of trees and carried to the nest by means of the beak. In rare instances when the leaves have not appeared, green twigs with buds and blossoms attached, have been employed.

Rev. Job has shown in photographic reproduction, the female on a stub close to the nest, with a piece of bark in her bill, evidently for the purpose of adding to her nest, and he informs me that on May 18, '08, he photographed the same bird as she brought a long strip of bark into the nest. Rarely, a few evergreen vines, wood plants or swamp grass may be used. Various reasons have been advanced for this very common trait of the Broad-wing, but all appear to be equally fallacious. There is very little ground for the theory of ornamentation or that the bird possesses the artistic sense in the slight-

Raptories should require protection from predatory animals. It is more likely the lingering vestige of the instinct that led its reptilian ancestors to employ decaying vegetation to develop the embryo. No doubt the moist tender leaf imparts more or less heat to the eggs, and as the habit is not abandoned until after the brood is able to clamber to the side of the nest, it serves the treble purpose: first a soft and warm bed for the callow young, and as the decaying refuse accumulate and the large tree ants, wood lice and ticks multiply, the successive layers become a matter of sanitation and protection. Almost all or our nest building *Raptories* are more or less addicted to this habit, none to the extent of this member, however. It seems to have an overpowering desire to bear something green to the nest after the real drudgery of construction is past. The references following the species below, give a more or less detailed account of green leaves in the nest, though seldom in the quantity and certainly not so consistently as in the instance of *Buteo platypterus*.

Ictinia mississippiensis Mississippi Kite, Goss, Bendire's Life Hist. N. A. Bds., 1892, 177; Singley, Davies' Nests, and Eggs, N. A. Bds., 3rd ed., 1889, 166; Short, Oologist, XXI, 1904, 37-39; Peabody, O. and O., XVII, 1892, 170.

Accipiter velox Sharp-shinned Hawk, Fisher, Hawks, and Owls U. S., 1892, 34.

Astus atricapillus Goshawk, Eifrig, Auk, XXIII, 1906, 314; Macoun, Cat. Can. Bds., II, 1903, 229.

Parabuteo unicinctus Harris's Hawk, Goss, Bendire's Life Hist., 235.

Buteo buteo European Buzzard, Seeböhm, *British Birds*, p. 205.

Buteo borealis borealis, Red-tailed Hawk, Burtch, *Oologist*, XXI, 1904, pp. 42-43; Sharp, *Ibid.* XXII, 1905, 43-44.

Buteo borealis calurus Western Red-tail, Dunn, *Oologist*, XIII, 1906, 73.

Buteo lineatus lineatus, Red-shouldered Hawk, Burtch, *Oologist*, XXI 1904, 42-43; Wood, *Ibid.* XXIII, 1896, 5; Brooks, *Ibid.* 21-22; Fisher, *Hawks and Owls U. S.* 65.

Buteo lineatus aleni Florida Red-shouldered Hawk, Singley, Davies' Nests and Eggs, 1889, 175.

Buteo lineatus elegans Red-bellied Hawk, Bendire, *Life Hist. N.*

A. Bds., 228; Sharp, *Oologist*, XXII, 1905, 43-44; *Condor*, VIII, 1906, 145.

Buteo abbreviatus Zone-tailed Hawk, Mearns, *Bendire's Life Hist.* N. A. Bds., 230-31.

Buteo swainsoni Swainson's Hawk, Bendire, *Life Hist.* 239. Fisher, *Hawks and Owls*, 77; Sharp, *Oologist*, XXII, 1905, 43-44; Wheelock, Bds. Cala., 152; Seton, Bds. Manitoba, 234; Macoun, Cat. Can. Bds., 236, quoting Raine.

Buteo brachyurus Short-tailed Hawk, Pennock, *Bendire's Life Hist.* N. A. Bds., 247.

Asturina plagiata Mexican Goshawk, Bendire, *Life Hist.* N. A. Birds, 252-3; Stephens, Davies' *Nests and Eggs N. A. Birds*, 179-80.

Aquila chrysaetos Golden Eagle, Bendire, *Life Hist.*, 96; Cameron, *Auk*, 1908, 252..

Measurements cannot be had with any degree of accuracy, especially in diameter, on account of the nests' irregularity; but it varies from 11 to 30 inches in outside diameter, 36 averaging 19 inches. Outside depth 6 to 18 inches, averaging 10 inches. Inside diameter 6 to 9 inches, averaging about 7.50 inches; and inside depth from a fraction to 5 inches, the average 2.50 inches. It is somewhat smaller and lacks the neatness of the Cooper's Hawk nest. The exterior as well as the interior soon becomes flecked with the down feathers of the moulting birds and is a sure indication of its occupancy.

A. C. Bent found a nest at Rehobeth, May 17, '08, containing three eggs 24 feet up in a small white birch which was but 4 inches in diameter immediately beneath a most insignificant nest, flimsily built, about 14x12 inches outside and 6x7 inches inside, lined with a few slabs of outer bark. Wm. B Crispin, Salem, N. J., found a nest on May 27, '00, in a crotch of small pine, 15 feet up. The nest was small and flat, made of a few sticks, and lined with pine needles only. The nest was so small that it would probably have been overlooked but for the sitting bird.

DEPOSITION—At Berwyn, Pa., one day intervenes deposition, ordinarily, i.e. in a set of three eggs, the order is: first, third and fifth day. Sometimes two or more days intervenes. J. H. Flanagan found a nest in Kent Co., R. I., containing one egg, for which a fresh hen's egg was substituted, May 19, '06.

On the 27th the nest contained a second egg which showed no incubation, while the hen's egg upon being broken exhibited incubation of about a week.

DATES FOR COMPLETE SETS—Audubon states that the eggs "are deposited as early as the beginning of March . . . but not until a fortnight later in mountainous parts of the districts in which the birds most frequently breed. Yet the only set of eggs he mentions having seen, was as late as May 30. Some of his immediate successors compromised upon "early April," and a host of later writers, even up to the present time, either boasting of their utter lack of personal experience with the domestic calendar of the species or distrusting their own observations; blindly accept the rather general statement of Audubon or his imitators, causing endless confusion in the ranks of the amateurs. The number of sets of eggs of *Buteo lineatus* and other early breeding *Accipitrines* innocently masquerading under the name of *B. platypterus* is appalling. Any one consulting the Bibliography at the end of this paper will see a number of corrections, preferably by the collector or writer acknowledging erroneous identification; and there can be little doubt that others would be discovered were it possible to have an expert handle the specimens.

The date for fresh eggs in complete sets varies according to locality, of course, but it is coincident with the bursting of the leaf buds on the surrounding deciduous timber, and right here it might be remarked that the immunity from persecution enjoyed by this species during the breeding season is as much due to the thickening screen of leaves nature speedily throws around its habitation as the birds' inoffensive habits. As C. L. Rawson says: "Not one farmer in fifty has ever seen the bird to know it. . . . Even the Lillibridges whose homestead has long been between two of the best breeding stretches of chestnut timber in many a furlong, did not know it, though they had shot, trapped and robbed nests of all the other local birds of prey."

Some latitude is to be expected in my averages through the probable inaccuracies in the reported state of incubation, there-

fore to be regarded as approximate only. 15 sets from the Lower Austral zone average April 28, extremes April 9—May 18. 331 nests from the Upper Austral and Transition zones average May 16, extremes April 24—June 25. 37 sets from the Canadian zone average May 25, extremes May 5—June 22. Western sets appear to average about two days later than corresponding territory in the east, and sets found in evergreen trees appear to average about the same period earlier than those in deciduous trees. The extreme dates are for the most part unimportant, representing as they do single instances of extremely early laying and of final effort after repeated failures. The normal egg producing period in a given locality is confined within about two weeks time, although the females may be about the nest for a month previous to deposition. I have in my possession a female shot from the nest April 17, '95, at Bradford Hills, Chester Co., Pa., in which dissection showed the egg developed to the size of large shot. In respect to the set recorded from Oneida Co., N. Y., on April 24, a very unusual date, Egbert Bagg writes: Langworthy was a good observer and perfectly trustworthy. He is dead many, many years, so I can get no information from him, but I am almost certain that Dr. Ralph authenticated this record before we used it. We were very particular in this respect and 25 years has not disproved a single record on our list. I have looked through my journal and can find only one other record and that was for a full set of four May 14.

Red River of the North, Minn. The time to expect eggs in this region is during the latter half of May (Preston). At Minneapolis, Minn., May 12 to 30. I never look for its eggs any other time, though I have found a set or two both before and after. I always figured upon starting out to collect its eggs on the first date and felt confident of finding complete sets of fresh eggs (Currie ms.). In Ontario it is a late breeder, seldom laying its eggs before the last week in May, though once I found its eggs earlier, May 8, '88 (Macoun quoting Rev. C. J. Young). Lancaster, N. H., May 4, '91, the earliest date; June 3, '04, the latest date: no second sets taken (Spaulding



BROAD-WINGED HAWK (*Buteo platypterus*)

Top and side views of nest and eggs. Berwyn, Pa., May 23, 1909
(Photographs by Alfred C. Redfield)

ms.). Franklin Co., Me., Fresh sets are secured as late as June 2-7 (Carpenter ms.). Bristol Co., Mass., May 14-18 is the local date for fresh eggs in complete sets (Carpenter ms.). Fairfield, Conn. The time of nesting varies but little, the extremes for first sets being May 9 to 19, with one exception, an instance of unusually early nesting that I could never account for, viz: May 17, '94, visited the Strong Hill tract and soon located the nest in a tall chestnut some 50 feet from the ground and a short distance from the old nest of '92. Upon ascending I was surprised to find it contained 3 young about 10 days old, thus showing that the eggs must have been deposited as early as the middle of April. My other birds in their chosen localities nested at usual time (Hamlin ms.). N. W. New York. Average about May 22, with a range of from May 15 to 30 (Short ms.). Renova, Clinton Co., Pa. Earliest, May 5, latest May 12 (Pierce ms.). Chester Co., Pa. Average date for fresh eggs in complete sets is May 15, extremes May 3-19 (Burns ms.). Illinois and Missouri, average May 14, 1891-1905; earliest, May 4, '91; latest, May 19, '00 (Smith ms.). Washington, D. C. Fresh eggs may be looked for from the first week in May until the first week in June (Riley). Leon Co., Fla. The average date for fresh eggs is May 1. I think it would be very difficult matter to find a nest with eggs before the last of April (Williams ms.). In Illinois and Missouri it prefers small woodland areas or groves of some few acres in extent (Smith, Jr. ms.), and in Florida it was found in the middle of a fifty acre woodland (Williams ms.). While collecting in conjunction with Mr. William Palmer in Pinar del Rio Province, Cuba, at San Diego de los Banos, we had some experience with this hawk. While making my way back to a temporary camp on April 7, 1900, I ran across a pair in the edge of open pine woods that bordered a thick tropical growth along the small river that flows by the town, and shot the female which upon skinning, was found to have an egg in the oviduct ready for deposition, but which was unfortunately broken when the hawk was shot or upon handling. Upon visiting the same spot with Palmer on April 11, there was an-

other pair acting as if they had a nest in the vicinity and gave the same note as far as I could tell as the ones found around Washington. Palmer shot the male and it was probably the mate of the one I shot on the 7th, already remated (Riley ms.). *B. p. antillarum* is engaged in incubation as early as March 25, in Grenada, W. I. (Ober).

NUMBER OF EGGS IN SET.—The pioneer writers give the maximum number in a set as 5, and Cory has recently reasserted it. Zadock Thompson gives an instance of a female shot while building her nest in April, 1840, near Burlington, Vt. Within her were found 5 eggs in different stages of enlargement, one appeared fully formed with shell quite hard and in a condition to be deposited in a nest. Bendire gave an apparently authentic instance of a set of 5 eggs collected at Quincy, Ill., and I have made an earnest effort to locate this unique set for the purpose of verification. The collector, T. C. Poling, informs me that he has given no special attention to ornithology for over 15 years; his collection and records were disposed of to Adolph Sutro of San Francisco, Calif., many years ago. J. Eugene Law writes me that Adolph Sutro was one of the city millionaire pioneers and the owner of a fine park in the vicinity of the Cliff House, which was destroyed. Sutro museum stood in the near vicinity. The set is probably now non-existent, and the few other claims have easily resolved into sets of 5 eggs of *B. lineatus*. J. D. Currie informs me that in Minnesota, out of about 40 sets found, 10 had 2 eggs each, 20 had 3 eggs each, 4 had 4 eggs each, and he considers four eggs in a set extraordinarily rare. Preston found a majority of sets taken in 1896 contained 3 eggs, while those of 1887 had, with few exceptions, but 2 eggs; however, in the total for the seasons, more sets of 3 than 2 eggs were taken.

The 406 sets, of which I have record, are divided as follows:
 Canadian Zone..... 1 set of 1, 26 sets of 2, 23 sets of 3, 9 sets of 4
 Transition Zone..... 7 sets of 1, 65 sets of 2, 98 sets of 3, 4 sets of 4
 Upper Austral Zone..... 6 sets of 1, 80 sets of 2, 66 sets of 3, 5 sets of 4
 Lower Austral Zone..... 1 set of 1, 12 sets of 2, 3 sets of 3, 0 sets of 4
 Total 15 183 190 18

It will be seen that we have here another instance of a substantial increase in the number of eggs in a set from the south northward. The number of eggs in a set is therefore 2 or 3, occasionally 1 or 4. When the first complement of eggs has been destroyed, the second clutch usually contain one less egg and the individual egg may suffer only a slight diminuation in size, or diminish in length and increase in short diameter (Richards, Spaulding, Hoag and Currie ms.). A third set seldom consists of more than one egg of inferior dimensions.

NUMBER OF SETS IN A SEASON.—This hawk, undisturbed, produces but one set in a season; and when the nest is disturbed, not all have the vitality to attempt a second set in the midst of the moulting period. Riley states that he believes but one brood is reared, unless the first is destroyed, when another set may be laid. Flanagan never found a second set after the first was taken, but on the other hand, Richards gives two instances, one pair producing the third set. Spaulding recalls two second sets of two eggs each which had previously sets of three eggs, laid in the very same nests. Hamlin collected a set of three eggs on May 14, '89, and a few days later on ascending to the nest he found a new lining had been added and three more eggs deposited. These were allowed to hatch but later the young were taken by a friend and reared in captivity. The bird then built in a tall chestnut some 10 rods distant and brought forth their young in safety. Currie writes me that he used to collect a few sets each year and in every case the birds would lay a second clutch of one less egg and always hatch them in peace. Bendire is without question correct in his statement that a single brood is reared in a season.

MEASUREMENT OF EGGS.—In selecting the eggs figuring in the averages I have used only well authenticated sets carefully measured by competent persons. Eggs abnormal or infertile, and those known to be the second or third laying of the season, have not been used in this connection. The value of any set of eggs would be greatly enhanced, were each egg marked according to the incubation or the succession in which they were deposited. The few sets I have been able to thus sep-

arate, prove in four instances out of five, that the smallest was also the initial. Dr. Coues remarked that he had noticed that the variation, however great, is less in absolute bulk than contour in eggs in general.

Total

Eggs	Set	Av.	Max. lgth.	Max. sm. di.	Min. lgth.	Min. sm. di.
9	1	1.89x1.50, 2.00 (x1.44), (1.91x) 1.57	1.72 (x1.42), (1.72x) 1.43			
182	2	1.91x1.52, 2.12 (x1.54), (2.06x) 1.69	1.74 (x1.52), (1.76x) 1.30			
274	3	1.93x1.54, 2.15 (x1.51), (2.02x) 1.64	1.75 (x1.53), (1.92x) 1.30			
44	4	1.89x1.52, 2.09 (x1.52), (1.96x) 1.58	1.80 (x1.47), (1.82x) 1.40			

—
509 averaging 1.92x1.53, (49x39 mm.). Sets of 1 average .03x.03, sets of 2, .01x.01, and sets of 4, .03x.01 less, and sets of 3 (which are with sets of 2, the typical number) .01x.01; more than the general average.

There appear no consistent geographical variations in size, whatever advantage is gained by the increase in the size of the set northward, up to the maximum dimensions in sets of three eggs, is lost again in the smaller measurements of sets of four eggs which are the production of northern birds exclusively. Minnesota is apt to produce the slim egg of maximum length and minimum diameter, while Pennsylvania, with New York second and New Hampshire and Vermont third, produces an egg of average length and maximum diameter; in reality the egg of the greatest capacity. Ernest H. Short gives the average size as 1.93 and 1.55, and the largest egg he regards as really authentic 2.06x1.61, taken by L. C. Snyder in Oswego Co., N. Y. Some of my correspondents as well as myself have remarked upon the variation of individual eggs in lesser diameter, often exhibiting from .01 to .03 according to position of calipers. Offering a layman's explanation, this may be due to uneven pressure before deposition, or perhaps the weight of the bird's body after deposition when the shell is more plastic. C. F. Stone has noticed this variation in eggs of the Red-shouldered Hawk he has measured, also. In the oviduct of a breeding Broad-wing shot on April 28, '06, by a friend, were three eggs in formative process; the largest would probably have been dropped in a short time, the shell was of a leathery

texture, pale blue in color and even a few shell marks present; this could be subjected to considerable pressure without breaking, immediately after removal.

Old works on the science almost invariably give the dimensions of the *B. lineatus* for *B. platypterus*, and the archaic methods of measurement were not wholly to blame. Erroneous identification is responsible for a great many specimens of the former labeled as the latter. When Chas. C. Richards measured the Lorenzo Blackstone collection of Broad-winged Hawk eggs in the State Hall, Norwich Free Academy, he also measured the smallest set of Red-shouldered Hawk's eggs in a series of 37 sets. They were 1.96×1.64 , $1.97\frac{1}{2} \times 1.68$, $2.06\frac{1}{2} \times 1.86\frac{1}{2}$, and were the smallest he ever saw of the species. His own smallest specimens in a set, of the same bird, are 2.02×1.64 , 2.04×1.66 , $2.00\frac{1}{2} \times 1.65$. In the matter of exchange, when a so-called Broad-wing's eggs runs over 1.60 in width, he thinks the collector's reputation should be O. K'd. That the dimensions of the eggs of the two species overlap, there can be no question, and in a region where both species occur, the oologist cannot be too careful in his identifications.

H. W. Beers took a set of eggs in Fairfield, Co., Ct., on May 14, '96, which is unique in the wide range in individual shells, 2.08×1.53 , 1.92×1.55 , 1.57×1.27 , the last named being a runt measuring little more in length than the smaller diameter of the first egg. An egg collected by T. and J. Flanagan in Kent Co., R. I., on May 19, '06, in a maple at the edge of a swamp takes the palm for dimensions. It is $1.30 \times .96$ and is well marked with splashes and blotches of rufous brown and lilac. The texture of the shell is coarse and somewhat granulated and a little malformed on one side, and of a dull finish. The nest was found on the 13th with the bird sitting on this runt, which proved infertile. J. H. Flanagan states that he has more than 200 sets of hawk's eggs of the different species of his own take and this is his only runt in hawk eggs. Probably the parent would have proved an aged bird, perhaps unmated.

Verrill gives the measurements of *B. p. rivierei* eggs as 1.80x1.50 to 1.85x1.55.

DESCRIPTION OF EGGS—Someone professes to see only two points of interest in a bird's egg—"One is what the egg is in, the other is what is in the egg." However, there are some very good people interested in the shell. Fragile, exquisitely beautiful specimens, more precious to their possessors than the finest old china, have passed from one generation of oologists to another, gems that love or money could not buy. A series, and sometimes the eggs of a set, show considerable variation in shape, ranging from elliptical ovate to oval; short ovate being the most typical, and ovate-pyriform the rarest. Of the latter type are a set collected at Chippewa, Co., Mich., and described by C. F. Stone; and another taken at Salem, N. J., by W. B. Crispin.

The ground color runs from pure white to grayish, bluish, greenish, and cream-white, grayish-white being the most frequent; the "dirty-white" ground color of most writers being exactly what it seems—dirty, soiled by the bird's feet. The shells exhibit almost maximum range and development of coloration in North American *Raptore*s, and a typical set very rarely contains more than two eggs of the same type; not infrequently all are different. In sets of two or three, one egg is almost certain to be of the gray or lavender sub-shell type and the remainder overlaid with pigment. In sets of four, the second egg may be an example of heavier sub-shell markings or lightly overlaid with russet or brown. The eggs of this species also present the odd characteristic of confluent pigmentation at the smaller end or apex as frequent as at the base. Six fairly distinct types are discernable without resort to combinations: (a) Immaculate, or with faint shadow markings. Not so infrequent as generally supposed. (b) Semi-obsured sub-shell markings of impure black or red and violet, producing the different grays, and the lilac-gray, heliotrope and lavender. Present in at least one egg of almost every set. (c) Sub-shell markings and surface stains of ecru-drab, fawn and drab. A rare form of coloration. (d) Surface pigmenta-

tion of yellow-browns, wood-brown, tawny-olive, cinnamon, raw sienna, raw umber, russet, etc. A not uncommon type producing perhaps the least attractive coloration. (e) Red-browns, mars, prouts, burn-umber, walnut, vandyke, chocolate and seal brown. The most common pigmentation, occurring in fully half of the eggs. (f) Subdued reds, rufous, brick, hazel, chestnut, burnt sienna and claret brown. A not infrequent pigmentation and producing very rich combinations; usually when present at all, occurs more or less on all eggs of a set. Appears most frequently on Minnesota specimens.

A white ground shows off the pigments to the best advantage, but the tinted grounds often aid the production of beautiful combinations. The most varied and brilliant series comes from Connecticut, though New Hampshire, Vermont, Massachusetts, Rhode Island, New York, Pennsylvania, Virginia and in the west, Manitoba and Minnesota, produce many beautiful eggs, greatly eclipsing the series from which Major Bendire took his descriptions. Mr. Riley recently informed me that the U. S. National Museum now has a series of 76 eggs and the variations are very great. Most of them have come in since Bendire composed his work, and many of them are much handsomer than any he figured. My own personal experience in southeastern Pennsylvania has been that the eggs taken by myself pale into insignificance in comparison to the brilliant examples taken by H. W. Beers in Connecticut. In descriptions, the blotches represent the larger, the spots the medium and the dot the smallest markings. In nearly all of the pairs visited by Beers, there has been a striking resemblance of eggs for two or often three years, and then perhaps a jump from one extreme to another; from very plain to the most remarkable type or *vice versa*.

Chas. C. Richards describes a set taken at Norwich, Ct., May 15, '08, in which one of the eggs was a solid bluish-white like a Cooper's Hawk, only smaller, the other shell markings of lavender heaviest at the large end, and over this a few light brown spots and blotches. He finds that the texture of the shells of this species is so porous that if the surface be damp-

ened, the markings in the shell will come out quite strong. R. M. Barnes gives at some length the markings upon a set collected June 10, '07, at Hyde Park, Mana., by C. P. Forge. All three show the effects of rotary action in the oviduct before the excessive deposition of pigment had thoroughly set, but curiously spiral or screw-like in formation, as if in progression. H. S. Hathway took two sets at East Greenwich, R. I., in which some of the eggs were strikingly similar to specimens of the Red-shouldered Hawk. Referring to Bendire's plate 7, No. 1 is like his figure 2 of the Red-shoulder, No. 2 like his figure 12 but more evenly speckled, and No. 3 similar but more color on small end, and all in size and shape as his figure 12 of the Broad-wing. No. 1 of his second set is almost identical with figure 13, No. 2 like figure 3 of the Red-shoulder, only more heavily marked, and No. 3 similar to figure 5 of same species, only more evenly marked. A set in the collection of T. H. Jackson, was taken by G. L. Hamlin at Bethel, Ct., and is described as of the size and shape of Swallow-tailed Kite's eggs and almost as handsomely marked. Ground-color, creamy-white, heavily blotched with two shades of brown, heaviest about larger ends. On the surface of one egg in a set of three collected by Albert Lockwood for John Gath, Lorrington, Ct., and described by J. Warren Jacobs, there appear markings in the form of the bust of a man in colonial dress, holding cocked hat in hand near left shoulder. Placed under a glass the blotches lose all resemblance of course. J. H. Flanagan took a set in Kent Co., R. I. on May 19 and 27, '06; the first heavily marked with rufous, the larger end covered as thickly as a Duck Hawk's egg, the remainder more sparingly and evenly marked; the second beautifully marked over the entire surface with large splashes of lilac and a few of rufous. Gerard A. Abbott describes a set in his collection selected from over a hundred eggs, taken at Minneapolis, Minn. Two eggs are almost completely covered over one-third with a peculiar brick-red on the smaller ends; the third is blotched about equally over entire surface and some of the markings are heliotrope. A similar set is described by Richards from the collection of Lorenzo Blackstone, Norwich.

Ct. H. W. Beers took a set at Bridgeport, Ct., in '09 that is described as different from any in his really wonderful series. The markings on both eggs are confined to the small end which is nearly solid bright rose-pinkish tint, and when fresh he thought them more beautiful than anything he had heretofore taken.

Second and third sets of the season are easily recognized. Richards gives the following instances in detail: *First set*, May 12, '08, bluish-white, (1) heavily sub-marked with lavender, under a bright rich hazel in spots and blotches, heaviest at larger end; (2) heavily sub-marked all over in spots and blotches with lavender, heaviest at ends, two or three brown spots over this, comparable to Fig. 10, pl. 7, Bendire's *Life Histories*. *Second Set*, May 29, '08, (1) similar to first described in previous set, lacking heavy markings at large end; one blotch about an inch square of lavender, center of shell has about two-dozen dark brown spots from the size of a pin to No. 12 shot; (2) dull white, heavily blotched and spotted with chestnut, a few pale lavender spots and small blotches at large end. The *second series-first set*, May 5, '08, bluish-white, spotted and blotched all over with pearl-gray and heliotrope, giving a marked appearance, and a few fine spots of rich hazel-brown on surface, looking like a large whip-poor-will's eggs without gloss: (2) faintly spotted all over with hazel-brown, brick red and small blotches of bright chestnut, with a wash of claret stain nearly all over, have never seen any egg colored like this; (3) greenish-white, shell markings of lavender with a pinkish tint, spotted and blotched all over with light brown. *Second set*, May 20, '08, 200 yards from first nest, (1) almost exactly like first egg of first set, except brighter and shell markings are all heliotrope and has a few blotches and spots of rich hazel-brown; (2) greenish-white, beautifully spotted and blotched all over with rich hazel and chestnut, forming a ring around larger end, one small blotch in the center of the shell has a wash of the peculiar claret on the second egg of the first set. *Third set*, June 8, '08, incubation four or five days, 100 yards from the second and 250 yards from the first nest. The single egg a composite

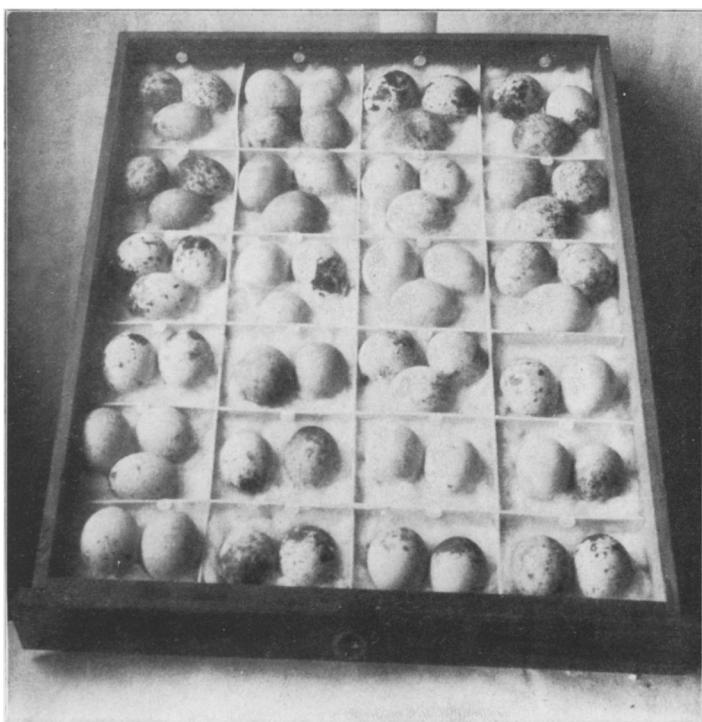
of the first and second eggs of first set, the color all run together and bleached out as if pigment was about exhausted. Around the smaller end are streaks of lilac and brown that look as if laid on with a brush foul with lint.

Buteo platypterus antillarum according to Wells, deposits two eggs, buff color, spotted and blotched with reddish-brown. Clark, however, states that three eggs are usually laid and that he has had the opportunity of examining through the kindness of Dr. Dunbar B. B. Hughes, a number of eggs of this bird, in the collection of the late John Grant Wells, which were obtained in Grenada, W. I. Six sets were represented. The eggs were all bluish-white, unspotted. The natives at St. Vincent also informed him that this bird laid unspotted eggs. *Buteo platypterus rivieri* eggs are described by Verrill as dull white, heavily washed and blotched with rufous, umber and greyish-brown.

DESCRIPTION OF A SERIES OF SETS—From over 100 sets never before described I have selected 15 sets showing, it is believed, every type of coloration known; the whole, added to those already described under previous sub-heads, making a truly magnificent series, which, aside from their value as natural history specimens are a delight to the eye of the lover of the beautiful.

Set I. Easton, Ct., May 30, '03, col. H. W. Beers, chestnut, 35 ft. Ground color white with very slight gloss and just a suggestion of green, 1.98x1.58, quite lightly but regularly spotted and blotched with a stain-like light mars brown, 1.96x1.60, shell markings so far beneath the surface or so light as to suggest a shadow rather than a describable tint. A few faint flecks of mars brown dispersed over surface, comparing with the typical *Accipiter cooperi* egg except in size, shape and texture; slightly granular at large end. 1.97x1.55, practically if not actually unspotted. I could detect a few faint flakes of undeterminable color besides the nest stains. Shell slightly granular at large end. The palest set I ever examined. Ovate. Desc. by F. L. B.

Set II. Chester Co., Pa., May 12, '88, col. by Thomas H. Jackson, chestnut, 48 ft. Dull grayish-white ground. 1.94x1.62, almost plain, sprinkled with dots size of pinhead all over, running into fine lines at greater end similar to markings on an Oriole's egg.



BROAD-WINGED HAWK (*Buteo platypterus*)

A series of eggs in the collection of H. W. Beers, Bridgeport, Conn

1.93x1.61, very similar though much more heavily marked at greater end. 1.95x1.65, quite heavily marked around small end with olive brown blotches and dottings.

Set. III. Easton, Ct., May 18, '08, col. H. W. Beers, chestnut, 30 ft. Almost dead white. 2.04x1.61, smaller end and almost to the middle scratched with countless microscopical hair lines of pale vandyke brown with a few spots and scrawls of a heavier calibre over two-thirds of this area. 1.97x1.57, almost entire surface clouded with longitudinal shell markings of smoke and drab, heaviest in a broad ring about one end, possibly the larger, though the egg appears an almost perfect oval. There are three or four tiny specks of walnut or pale vandyke brown. Oval. Desc. by F. L. B.

Set IV. Trumbull, Ct., May 19, '99, col. H. W. Beers, chestnut, 25 ft. Dead white. 1.90x1.44, palest possible shell markings of drab gray, most numerous about larger end, with scattered stippling of walnut at base, thicker and paler at apex. 1.79x1.39, shell markings of ecru drab and drab, the latter confluent in broad band around smaller end principally, overlaid on surface of minor third and a few scattered to base, with fine spots and blotches of burnt umber. This is a most remarkable looking egg, one which would attract attention in any collection. Ovate. Desc. by F. L. Burns.

Set V. Berwyn, Pa., June 5, '95, col. F. L. Burns, chestnut, 47 ft. White ground. 1.76x1.45, wood brown appearance, heaviest at larger end, stippled or flea-bitten look more often present in the eggs of the Sparrow Hawk. Short ovate. 1.83x1.51, surface stain in large blotches confluent on one-half of the smaller end, extending on this side out to the center, of a very pale mars brown, almost faun. A few shadow-like shell stains of no definite color. Ovate.

Set VI. Calais, Maine, May 17, '94, col. George A. Boardman. Dull white. 1.92x1.52, evenly sprinkled all over with fine dots, small spots and irregular blotches of pale tawny olive and raw sienna. 1.99x1.50, more sparingly splashed with irregular small blotches and scattering dots of wood brown and raw umber. 2.01x1.51, irregularly splashed with blotches, chiefly about the smaller end, with wood brown and prout's brown. All of these colors have probably faded. Oval to elliptical oval. Desc. by A. C. Bent.

Set VII. Carver, Mass., May 22, '01, col. A. C. Bent, white pine, 40 ft. Dull white. 1.93x1.53, partially clouded with lavender gray, heavily blotched, particularly about the small end, with vinaceous and heliotrope purple, underlaid with irregularly broken blotches or clusters of confluent small dots of cinnamon rufous.

1.89x1.50, heavily clouded with lavender and pale heliotrope purple, particularly about the small end, nearly concealing the ground color, also sparingly washed with vinaceous cinnamon, with one blotch and a few dots of chestnut. Ovate to oval.

Set. VIII. Carver, Mass., May 26, '06, col. A. C. Bent, white pine, 24 ft. Dull white. 1.95x1.52, heavily blotched, principally about the larger end, in an irregular and open pattern, with cinnamon, overlaid with spots of burnt umber and chestnut. 1.93x1.50, nearly covered with small dots, confluent into blotches and concealing the ground color of the larger end, of russet, overlaid with spots of burnt umber and washed at the large end with bright vinaceous-rufous. 1.92x1.50, uniformly spotted with lavender gray, and sparingly with russet and chestnut. Ovate to oval.

Set. IX. Berwyn, Pa., May 11, '88, col. F. L. Burns, chestnut, 38 ft. Cited as deposited. White. 1.96x1.54, speckled and spotted over the entire surface, blotched at smaller end, with mummy brown; on the smaller end the blotches are laid on so heavy in places as to appear deep vandyke brown. 1.88x1.63, infinitesimal dots and specks over surface, assuming an almost solid stippled-like appearance on minor third, all of a walnut brown. This fleabitten semblance gives the ground a creamy-white look whenever visible. 1.83x1.60, under shell markings gathering at the minor end. A few surface markings of mars brown. This egg is of the type illustrated by Bendire in fig. 12.

Set. X. Monroe, Ct., May 15, '05, col. H. W. Beers, chestnut, 40 ft. Dead white. 1.90x1.56, spotted and blotched with mars brown, the centers of the largest splotches suggesting burnt umber, confluent in broad band just back of middle and extending almost to base. 1.91x1.51, heavily stained about smaller end with chocolate, overlaid with walnut, scattering irregularly to base in detached spots. A richly marked set of the most frequent type. Ovate Desc. by F. L. B.

Set. XI. Monroe, Ct., May 24, '06, col. H. W. Beers, chestnut, 25 ft. Pale greenish-white. 1.92x1.49, a band of vandyke brown confluent blotches centered with the darker seal brown, forming a cap about larger end and has the appearance of having been so thin a stain and the shell so absorbent that it spread and blurred as upon blotting paper, the color regularly punctured with minute bubble-like dots showing the ground color beneath. Two-thirds of the shell unspotted. 1.94x1.53, desultorily smeared in blotches about larger half with clove brown, which appears half obliterated as from a wash before wholly dry. Most of the shell unspotted entirely. A unique set. Ovate. Desc. by F. L. B.

Set XII. Easton, Ct., May 15, '02, col. H. W. Beers, chestnut, 35 ft. White. 2.00x1.50, heavily blotched with burnt umber and walnut, forming a whorl about the base and practically covering the ground. 1.90x1.49, heavily marked with mars brown, ground invisible at base, which has a few scrawls of walnut overlying confluent mars brown. 1.91x1.47, so heavily clouded with shell markings of drab and fawn as to render the ground nowhere plainly visible and about the greater end completely obscured. An almost invisible stippling of pale walnut over entire surface. Quite unique. Ovate to elongate ovate. Desc. by F. L. B.

Set XIII. Trumbull, Ct., May 12, '03, col. H. W. Beers, chestnut, 50 ft. Dead white. 2.02x1.58, very large blotches, some of them .50x.75 in diameter, of a deep rich walnut, almost liver brown, over the larger end and extending in lesser spots on one side only, to near apex. 2.00x1.55, comparatively immense shell markings of drab-gray, one being .50x1.25, chiefly back of greater diameter and spreading in smaller spots toward smaller end, which remains unspotted. These shell markings are partly overlaid with pale vandyke brown, with here and there a spatter of mars brown. A very striking and handsome set. The second not so richly colored as the first, is of the type exemplified in Bendire's fig 11, but much better colored. Ovate. Desc. by F. L. B.

Set XIV. Carver, Mass., May 25, '07, col. A. C. Bent, white pine, 31 ft. Pale bluish-white. 2.03x1.51, heavily marked with large irregular blotches, spots and dots of cinnamon rufous, brick red and burnt umber, the latter overlying the lighter colors. 1.92x1.51, heavily marked, principally about the small end with vinaceous rufous and burnt sienna, the latter on top of the lighter spots. 1.89x1.49, more sparingly blotched and spotted, principally in a ring near the large end, with cinnamon rufous and burnt umber. Ovate to oval.

Set XV. Hyde Park, Mana., June 12, '07, col. C. P. Forge, willow bush. 10 ft. Ground color white to soiled white. 1.89x1.49, almost completely obscured by vast numbers of small irregularly shaped bluish-gray markings, darker at smaller end and showing a slight rusty tinge of color. 1.87x1.43, very thickly marked about the smaller end with very light rusty red in small blotches, almost running into each other and scattered over the large end. 1.96x1.55, heavily marked over the larger end with a mass of light rusty, reddish markings, almost obscuring the ground color on that end, and scattered rather thickly over balance of the surface. 1.82x1.40, rather thickly marked with very many irregularly shaped blotches of bluish-gray and lavender, a few bordering on a light rusty red in color. Desc. by R. M. Barnes.

Incubation.

This bird is a devoted brooder, both sexes assisting, as testified by Messrs. Banks, Bendire, Knight, and verified by myself. An almost invariable sign that incubation is progressing, is the down feathers adhering to the nest. Chas. Richards nicely illustrates the secretiveness and close sitting of the species in his notes of a set taken in an open wood or park, Norwich, Ct., May 20, '08. He says that on the 17th a man and woman were practicing at a mark with a 22 calibre rifle within 100 yards of the nest where the hawk was sitting. On Sunday afternoon 54 people were counted within sight of the nest at one time, and a woman with a couple of children roaming around was actually sitting on a rock under the nest, all unconscious of its tenant. George L. Hamlin relates an instance where the birds had been sitting about ten days when a neighbor to whom he had revealed the nest, from a mistaken sense of duty, shot the female from the nest. The male completed the incubation, and later, the single young was procured and reared in confinement when nearly fledged. Again, early in May, '93, a nest was found just completed. No eggs were ever deposited and but one bird seen in the vicinity. At every visit he showed as much solicitude as if it was occupied, and several times upon ascending, fresh green poplar leaves had been added to the lining. The nest was not deserted until the latter part of June; the conclusion that it was built by an unmated or bereaved male, seems well founded.

An ancient trick, often very much abused, is to replace an incomplete set with the eggs of the domestic hen, and the *Buteo*'s utter lack of discrimination is evinced by brooding over it for many days. The female not infrequently sits on the nest a short time every day for several days before an egg is laid. J. Claire Wood adds his testimony to mine in this, having witnessed an instance.

John H. Flanagan believes incubation begins with the first egg. In support of this he relates two instances: Nest found in Kent Co., R. I., May 18, '01, contained one egg, and two on the 26th, one well begun in incubation and one fresh. A set

of four taken May 27, '05, incubation varied from fresh to above one week in one egg. Other sets, however, exhibited uniform incubation, which is the rule. Walter A. Angell took an egg and two young just hatched, from a nest on June 19, 1907, and the egg hatched under a hen the next day.

Bendire places the period of incubation at from 21 to 25 days. Near Berwyn, on May 19, '01, at 12 M., I flushed a female from the same nest as that used in '94. Two large eggs lay on a bed of chestnut bark scales, and a single bunch of green chestnut-oak leaves, just garnered. Bird not on at 5:15 P. M. On May 30, I found the lightest marked egg standing on its greater end, punctured by a nest twig. It contained a rather medium-sized embryo. The bird was not seen, though the sound egg was warm. May 31 the male was flushed, no additional lining except a single moulted secondary. June 10, at 7 P. M., female flushed; sides of nest built up neatly, fence-like and about three inches all around with green chestnut-oak leaves and several clusters placed under the egg, the latter slightly cracked at one side. Female protested at the slowness of my decent. June 12, 7 P. M., parent stole off silently and unseen. I heard the faint peeping of the nestling before I was within ten feet of the nest. It had just hatched and not yet entirely free from the large end of the shell, sprawling upon its breast with chin resting on the side of the nest. The female uttered a protest from a nearby tree, and I hurried down, being just seven minutes from time of strapping on climbers until on my road home. I would place the period of incubation of this egg at fully 24 days, as to the best of my knowledge the egg was perfectly fresh on the 19th of May. I regret to say that all other of the several tests made by me, were less perfect through my inability to ascertain the exact dates of commencement, though I have been fortunate enough to be present within an hour of the hatching on more than one occasion. Fred H. Carpenter offers two instances for calculation, both from Bristol Co., Mass.: May 17, '03, two eggs; June 4, no change; June 12, one young at least two days old, and one addled egg. May 17, '03, three eggs, one taken proved fresh;

June 4, no change; June 12, one young and one pipped egg. Apparently a period of 23 to 25 days.

Young.

CARE OF THE NESTLING—I have studied the nestlings of five different nests. So silent and secretive are the devoted parents that only one nest was discovered after the brood had appeared. I had passed and repassed almost daily the white oak which stood at the juncture of two woodland paths, without discovering the hidden nest, and it was not until I had finally tarried awhile at the nest of an Oven-bird close by, that I noticed the ground within a radius of perhaps twenty feet plentifully besprinkled with the excrement of the three young larger than squabs, that the female at last betrayed, June 19, '00. Contrary to the general belief, the forcible ejection of excrement is not peculiar to the young alone as any one having an adult captive may discover. In another instance the single nestling hatched on June 12, and left the nest July 23, '01, a period of 41 days. In another instance two out of three eggs hatched on June 3, '06, and the infertile egg disposed of soon after. Later one of the young died and was probably carried away. The remaining nestling was taken by me on July 1, after it had prematurely flushed from the nest on my unexpected appearance; the period was 29 days. Abundance of food is provided and the nest supplied daily with green leaf sprays, by the parents. The tender young are protected from the hot summer sun, inclement weather and cool nights. I have found the male covering 5 days old hawklets. Even when they have become fairly well fledged, one or the other of the birds seem always in attendance in a nearby tree top. The whistled protest of the parents as they shadow one through the woods, is all the hint one often has of their presence and unceasing vigilance. How long they are guarded after leaving the nest, I am unable to say, but for a week or two after the nest is vacated, a protesting whistle from a hidden form in the neighboring foliage informs one of the jealous care of the juveniles doubtless also hidden nearby. The immatures



BROAD-WINGED HAWK (*Buteo platypterus*)

Nestlings about two weeks old

(Photographed by Thomas H. Jackson)

are unmercifully driven out of the adults territory the following spring, should they attempt to invade it. Parental care does not survive the winter's frost.

DISPOSITION OF THE NESTLING—The spirit of adventure and acquisition which leads men to oological fields, fails to attract many to the equally important study of the young; therefore I am compelled to rely almost wholly upon my own data in this respect. I appreciate the fact that in viewing the beautifully painted shell ruined by the struggling chick, the feelings of the oologist are akin to those of the orderly collector of skins observing the plucking of the feathers of a rare bird; or the photographer, seeing the bird he is about to picture, fall before the gun of a sportsman.

The chick utters a peeping cry as soon as out of the shell and appears hungry as soon as its down has dried. I have seen it turn its head and bite at my thumb, when less than a day old. For some days the adults dismember the food and the young soon learn to snatch it piecemeal from their beaks. When from five to eight days old it sits erect and its mouth fies open at every sound; it is able to disgorge a pellet the size of a hazelnut, scratch itself and behave as well to its mates as the best tempered of birds.

DEVELOPMENT OF JUVENILE PLUMAGE—The young upon hatching June 3, '06, was well covered with white down, eyes and bill blue-black, cere very pale yellow, feet, tarsi and edge of mouth flesh color; and eight days later the feet and tarsi were the palest possible flesh tint with incipient yellow cast, and the talons blue-black. Another about 10 days old June 20, '07, was entirely covered with down except the abdomen, which was bare; the skin around the eyes greenish-yellow; midway between tip and beginning of the curve of the beak was a whitish protuberance; in all other respects as described in last year's nestling.

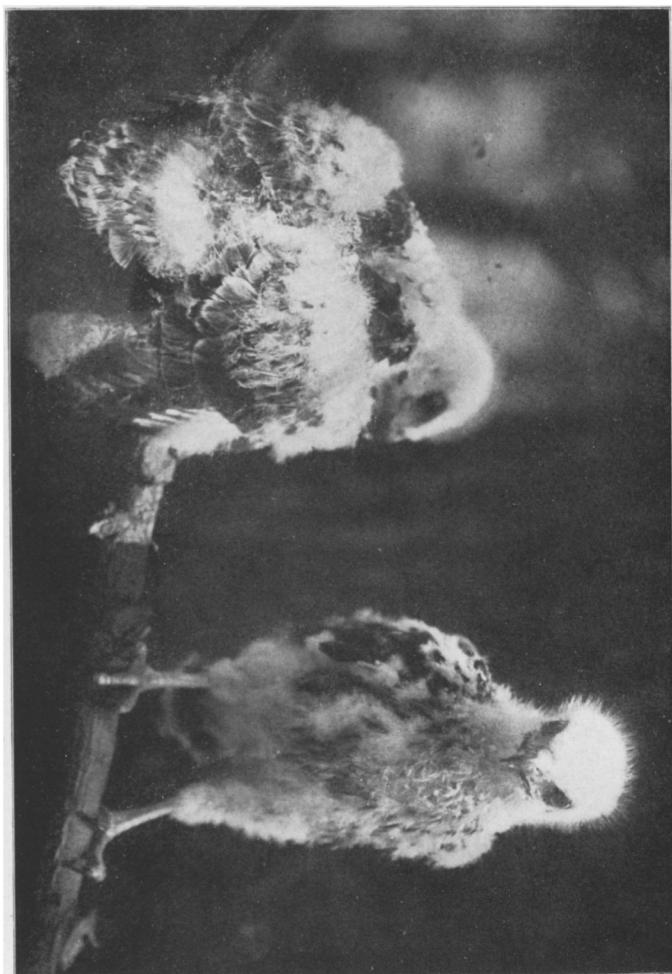
For my own convenience my subjects have all been taken from the nest at some period and reared in captivity. I endeavored to supply them with their natural and as varied food as they would have received in their nests; therefore the growth

of the feather tracts was perhaps altogether normal. Chester Co., Pa., June 12, '10, one young about 10 days old, weight 4 ounces, still in its nestling down, pupil appears blue and iris deep brown. June 17, about 15 days old, primaries and secondaries developing in quill; June 18th, greater coverts appearing in quill; 19th, alula, scapulars, inter-scapulars in quill; 21st, coverts coming out quite regularly, also nape and rectrices; 22nd, 20 days old, primaries, secondaries and tertials bursting sheath, nape down to middle of back, upper tail coverts; 23rd, sides of breast, irides wood brown; 24th, interscapulars show through white down quite prominently, rump pin feathers (compared with young bird in nest July 4, '00, known to be 22 days old; down covered head, neck and thighs, primaries and secondaries broken sheath and partly developed, breast feathers dashed with tawny but not to middle, irides hair brown); 25th, colors distinguishable; 26th, pin feathers down back to rump, under tail coverts; 27th, pin feathers spreading on abdomen and breast. July 1st I was compelled to kill this bird. On the 27th I was away all day and left word that it should be fed often, but my niece neglected it, and the poor little creature, frantic with hunger, tumbled out of its box in its efforts to meet me as I entered in the evening, breaking its right leg above the heel and since almost refused to eat. Description: feet and tarsi straw yellow, cere citron yellow, edge of mouth, skin of lores and lower eyelids, pale greenish-blue; irides mouse gray, weight 9 oz., about 29 days old.

Two captives taken on July 2, '07, 22 days old, were "Tuck" the larger, older and male bird; and "Nip" the female; natal down, except as herein noted, humeral tract or scapulars evidently first showing two or three days back; alar tract, secondaries, tertials, greater upper wing coverts, followed by the primaries, primary coverts and alula, rectices less than one-half inch in sheath; ventral tract, patch appearing on side of breast but not below; spinal tract, first traces between shoulders; femoral tract, first traces; irides slightly lighter. July 3rd, spinal tract, first traces appearing prominent; humeral, spreading, showing a V-shaped tract when wings are closed; altar-primar-

ies evidently later than secondaries, middle wing coverts as well as lesser coverts not yet in evidence except a few scattered feathers, primaries 3.40 on Tuck, 1.70 on Nip; caudal, rectices 1.87 Tuck, 1.40 Nip, upper tail coverts just appearing; femoral, first appearance beyond down; ventral, slightly extending; capital, dark feathers appearing on crown on Tuck, July 4, humeral tract spreading out over shoulders; ventral spreading a little on breast and extending slightly towards abdomen, crural—scattering, femoral extending downward. 5th, 25 days old, spinal tract spreading out over shoulders, ventral spreading a little on the breast and toward the abdomen, crural, scattered feathers appearing on the legs and flank extending downward to legs. 6th, spinal tract extending toward neck, a thin line from back of shoulders to almost small of back and appearing again at rump; humeral well grown, femoral extending rapidly to tibæ; capital extending on hind head of Tuck, malar in dusky dots, dark feathers just appearing under down of crown in Nip; alar filling out rapidly, lining of wings developing, ventral filling out and extending; caudal, greater upper tail coverts well along and lesser spreading, under tail coverts growing rapidly. 7th, spinal tract broadening between shoulders and at rump and scattered almost to hind neck, erectile upon excitement, rump almost complete on Tuck, scattered and less complete on Nip; alar, upper wing coverts almost all showing, only considerable gaps about median, under wing coverts starting, lining well along, feathers of thumb one inch out of sheath, as they have been for some time; capital feathers extending downward to and on hind head under down, crown feathers appearing above down on Tuck; lores appearing in dark dots, ventral feathers practically complete below breast, first band of tail of Nip and second of Tuck. Head, neck, middle of breast, edge of wing, median wing covert region, back of shoulder to rump and under wings, downy. July 8, Tuck has the richer underparts and more rusty edging of upper plumage so far, and a scattering of dark feathers all over center of crown and hind head, lores extending to eyes and malar to ear coverts; Nip's rump not at all complete, con-

sisting of a scattering of feathers, median coverts with frequent bare spaces, first evidence of dark feathers above down on crown, ear patch and lores broadening, second tail band clear of sheath, primaries and secondaries not wholly clear but the dark bands have become prominent; cast sheaths plentiful. July 10, 30 days old. Tuck has an increase in feather tract of crown, hind head, and almost complete from forehead to shoulders, lores connected with check by broken line over eye, chin feathers appearing on either side, forehead only immaculate down; lining of wings almost complete, downy tract at base of quill feathers; spinal tract complete from shoulder to rump, thighs and spots on the middle of breast downy, irides plumbeous-gray. Nip, spinal tract almost to rump and creeping up back of neck, ventral shows a downy line down the center of breast, breast feathers extending toward throat; middle of crown and hind head exhibiting a sprinkling of dark feathers, wing lining not yet complete, eyes darker than Tuck's. July 11, Tuck almost completed juvenile plumage with the exception of inner thighs, anal region, area under wings between rump and femoral tract; down also remains on the middle of throat, sides and back of neck, forehead and suprabrachial region, though the darker feathers have developed under all except the middle of the throat, third band appeared on tail, a sub-malar streak and under primary coverts have appeared. Nip is not so well along, though the spinal tract is complete; the head almost as far along except forehead, chin and throat; wing lining shows a downy line at roots of quill feathers, scattered feathers creeping up on throat; 12th, Tuck still has some down areas on a line over eye, middle of forehead, eyelids, posterior half of orbital ring, just back of ears, and middle of chin. Nip has a greater extent on the same places; 13th, little change, less down; 14th, Tuck, under wing coverts; 15th, third dark band on tail. Tuck's eyes almost pear gray, down almost absent except on middle of chin. Nip, down above eye and to a small extent back of it, a little on forehead and more on middle of throat and chin; July 17th, fourth dark tail band on Tuck; 19th, fourth dark tail



BROAD-WINGED HAWK, 23 days old. "Nip and Tuck."

Photo by Lucy Sampson

band on Nip ; 20th, fifth dark tail band appearing ; 23rd, Tuck has lost all traces of down ; 28th, Nip has six bars on tail, same as Tuck, and has no longer traces of down under chin or about eyes. August 3rd, seven bars on tail ; 9th, both hawks' eyes at last a clear pearl gray without the brownish, cloudy effect.

A female designated "Buteo" was taken from the nest July 1, '06, when 29 days old, when the juvenile plumage was developing under nestling down, the tips of nearly all the feathers bearing tufts of down, the occiput, lores, middle of breast, etc., only in the natal stage, irides pearl gray. July 4, wing 15:50, tail 3.50 ; 6th, second bar appearing on lengthened tail, barring appearing on primaries and secondaries ; 7th, down off of back and wings, confined to ends of rectrices, wing coverts and head ; 9th, tail shows five narrow dark bars, down almost absent from head and chin, whole upper plumage exhibits silky sheen ; 10th, down yet present on wing coverts, strip over eye, middle of forehead, middle of chin, scattered on malar ; 15th, down disappearing from all but middle of chin and throat ; 22nd, chin down absent ; 23rd, seven dark bars on tail, irides darker ; August 5, rufous edging of upper plumage worn away ; Sept. 17, irides a light burnt umber.

It will be noted that the irides became pearl gray in 29-34 days. Juvenile plumage shows first signs of development when the bird is 15 days old and is completed by the 45th-51st day, a period of about one month to five weeks. Jefferies notes eleven primaries, ten coverts, and a terminal claw, in the young examined.

DEVELOPMENT OF INSTINCTIVE HABITS—A nestling at 10 to 12 days of age snatched bits of meat from my fingers, rejecting a bit with a piece of bone in it, throwing the morsel some distance ; and peeped lustily for more. It could turn about the box very quickly, prance on one foot at the time and go through the motions of preening its own feathers, and slept with the crown of its head on the bottom of its nest with its beak between its thighs. First attempt to pick up food was when it had attained the age of 17 days, unsuccessfully attempted to

hold the meat in its claws by one foot then the other forward. Fed to the limit of the capacity of its crop, it would flatten out on its breast with extended wings and head for a sun bath, and learned to pull food from my hand with the twisting motion of the adult.

As my head came to the level of the nest of a pair of nestlings 22 days old, they arose upright with wide open mouths and while they almost fell over backwards with surprise, they seemed as yet devoid of fear. The female, for so it proved, showed the most spirit and enterprise though a day behind the male in growth. At 23 days of age they stood upright in home-made nest, dressed their plumage, whistled in a chucking voice, picked the dismembered bits of 4 English sparrows from my fingers, gathered them up from the nest and snatched them from one another. When 24 days old the wing and leg exercises began. They danced with raised wings, heads bent toward lifted toes and wings almost touching above. During the day they occasionally lay on their sides with extended legs and slept at night squatting on their keels with heads partly under left wings. The next day they fought one another over the food, plucking at one another's heads and necks, the male, which is the largest, on the defensive. Both whistle, grasp and tear food with talons and beaks. On the 26th day the male grew timid, dined with its back toward me, blanketed its food with its wings: the female on the contrary fearlessly faced me, continued its whistled "chucks," and then turned upon its nest mate and whipped him thoroughly. 27th day both could be easily handled. When full to bursting, they moved their heads and necks backward, forward and sideways. Female fought for and obtained from the larger male, two live English sparrow nestlings which she killed. I reduced their meals to four a day. On the 28th day, male showed fear plainly, no longer accepted food from my hands, the next day absolutely refused to eat while I was looking, and the day following flew about to avoid me, while the female continued gentle and fearless. On the 31st day the female ate 12 good-sized crayfish, seemed to relish tearing them apart and devouring the pieces, though

when one big fellow caught her by the leg, she backed away, and did not appear anxious to risk another nip. The male would not come down to feed. The next day the female refused for the first time to take food from my hands, and the following day began to fly about. When 37 days old, just before a thunder storm, both retired to the shelter of a box and huddled together in a crouching position, timidly peeped their fears; but two days later during a very heavy shower I observed both now, nearly of a size, exposed to the full force of the storm. They drooped their spread wings forward slightly above the level of their backs at times, seeming to enjoy the bath. When 40 days old both were very wild and made constant attempts to escape through the wire enclosure. This is the age of departure from the home nest. The next two days both birds clawed me fiercely, whistling excitedly, and would not touch food until I departed. When 46 days old the female which has at last outgrown the male, swooped down, snatched a piece of meat and carried it to a favorite perch ;and by another week or two, learned to whistle insistantly when hungry, until fed; a long drawn harsh shrilling *che-e-e-e-e-the-e*. My first and in some respects most interesting captive was taken when at the age of 29 days. It flew from the nest when I ascended but unable to sustain flight, came down on the banks of a creek below and was captured after it had turned upon its back and fought savagely, uttering a repeated *Chic-chic-chic*. It proved to be a female. It refused to eat at first. I had to force food down its throat, but it rapidly responded to kind treatment and by the next day perched upon my hand. It made several attempts to swallow a mouse whole when 35 days old, then turned its back to me, blanketed its prey with spread wings and tail, for the first time used its beak in conjunction with talons to tear and feed; and in consequence grew fierce and wild over night since it could help itself, and pounced upon a dead mouse and various sparrows with great gusto. When 39 days old it eyed live and fully fledged English sparrows before striking with right foot, and listened momentarily to their cries. This was its first kill and attempt to pluck feathers

before eating. On the 40th day it learned to spring from my hand to seize its prey in its beak before placing it under its talons. Could fly well and began to long for liberty. One week later it beat against the window. It learned to eye its feeding board whenever I appeared, and a stranger so fiercely as to have the appearance of about to attack him; and for the first time used its left foot in striking its victims. It was not until it was 89 days old that it uttered its first "rusty hinge" whistle, the adult and harsher cry than the juvenile.

Moult and Renewal.

Much to my surprise I could discover absolutely no literature on the subject except the following eight words from Maynard: "Like most hawks, these birds moult in August." Of the closely related Swainson's Hawk, Dr. Coues writes: "A moult occurs in August and September; it is protracted, the feathers being very gradually renewed, almost one by one; the fresh heavily colored feathers contrasting strongly with the ragged and faded ones worn during the summer. The young have no moult at this season. I have no observations upon a spring moult, which probably occurs in both old and young." Newton intimates that Diurnal Birds-of-Prey generally moult in mid-winter or even later. Under the title of "Observations on the Color Changes in the Genus *Buteo*, Apparently Due to Aptosochromatism" (cf. *Bul. Hadley Climatological Laboratory University, New Mexico*, III, 7, July, 1903, 1-14) the late Frances J. Birtwell gave the results of the examination of an adult and juvenile *Buteo swainsoni* on Dec. 7 and May 6, and an adult *Buteo borealis calurus* on Dec. 7, and April 1, confined in a basement during the winter, to prove color change without moult. Unfortunately May 30 witnessed the only collection of moulted feathers and the search for new growth on the birds at the time of skinning.

Plucked of feathers the adult is found completely covered with a heavy coat of down, even to the tips of the wing bones and heel joints; white, except a dusky streak along the wing bones at the insertion of the greater coverts.



BROAD-WINGED HAWK, 29 days old. "Nip and Tuck."
Photo by Lucy Sampson.

Oologists, with their intimate knowledge of the breeding habits of the bird, frequently note traces of moulting about the nest. Fred E. Newberry writes of a bird sailing over the tree tops dropping a large quill feather at his feet, and of occupied nests profusely feathered; Chas. C. Richards of three tail and numerous body feathers under a nest in June, from which the young had fled; and J. Claire Wood observed traces of the adult plumage in the lingering migrant immatures in June, suggesting a transformation into adult plumage during the summer of the second year. I have frequently gathered moulted feathers in the woods and under the nests, recently dropped, during the nesting period. A skin in the collection of the Phi. Acad. Nat. Sci., taken at Hudson, N. Y., as late as May 25, shows no evidence of moulting, however. Trowbridge states that he has found several of the adult specimens shot in Sept. 24, '87, at New Haven, Ct., moulting about the head. He fails to inform us, however, that otherwise these were in fully renewed plumage.

My captives passed through the annual moult I believe in no wise different from the average bird of the same species in a state of nature. They received sufficient natural and varied food, were kept in the open and altogether in a healthy condition. I gathered the moulted feathers once or twice each day and placed them in dated envelopes, and the birds were examined as frequently and as critically as it was possible to do where the subject was a biting, clawing and struggling savage. The feathers on one specimen dying in February were actually counted, numbering 2842; the smaller feathers of the head, chin, throat, lesser wing coverts and under wing lining, about totaling 1805 feathers, were largely lost in the open cage but most of the balance and more important plumage, saved as above related. My notes follow:

FIRST MOULT, POST JUVENILE—The spring moult began with the female "Nip" on the morning of April 19, when the 10th and 9th pairs of primaries and first scapulars dropped; by the 24th the 8th primary and first scapulars were cast, followed by the 7th the next day when the 10th, 9th and 8th primaries

and coverts broke sheath, marking the commencement of the renewal. May 5th the right 6th primary fell and the first alula followed on the 6th. On the 8th, the right 5th primary, several great and middle wing and under tail coverts fell. 9th the 6th left primary, first indication of interscapular and side of breast moult; renewal of last three primaries and coverts about completed, and the 7th a little nearing bursting quill. 10th, first scapular moult of moment. 11th, middle rectrices, middle tail coverts, smaller alula, increase in scapular and wing covert moult. 14th, beginning of wing lining moult, 7th primary more than half complete, 6th bursting sheath, one tertial cast. 17th, right primaries several days ahead of left, 4th right primary cast, middle tail coverts breaking sheath ahead of rectrices. 18th, increase of under tail covert moult and first flank feather cast. 19th lesser coverts at bend of wing lost. 22d, 4th primary on right nearly three-quarters grown, 6th and 5th not more than one-half, 4th primary on left, 3rd on right and 2nd left secondaries cast. 24th, outer pair of rectrices, increase in median coverts and first cervix feathers fell. 25th, middle rectrices and coverts one-third grown, last four primaries full, 6th two-thirds, and 5th and 4th bursting quill. 26th, first abdomen, increase in breast, side, flank and scapular moult. 29th, jugulum moult, rectrices 3rd from center, 3rd primary dropped. June 2, 3rd primary almost complete on right, in quill on left, middle rectrices show the second dark bar, 3rd from center appearing out of quill. 8th, alula moult complete, secondaries one pair about 2nd half completed, another about 6th one-third grown, corresponding coverts bursting quills, interscapulars in two lines up the back, half size and conspicuously dark, hind head renewing and two scattered lines on either side of the breast half size; long flank, side and abdominal feathers loosening up. 9th, left 3rd and right 2d primaries, many breast feathers, throat, first rump, tibæ, several tail and wing coverts cast. 10th, middle and lesser coverts with but a scattered renewal, bend of wing and lining practically renewed, middle rectrices almost complete, outer pair one-half and but two old pairs remaining, upper and under tail coverts but little ad-

vanced in pin feather stage, a row of barred feathers appear on either side of the breast and a solid row of interscapulars on back. 14th, primaries—1st old only remaining, 3rd and 4th not quite full length on right side; on the left 2nd and 1st old remaining; secondaries, right, about 3rd and 6th almost three-quarters length, left, 2nd, 5th and 6th same length, middle coverts everywhere in pin feather stage, 2nd greater secondary covert almost complete. 18th, no marked moult for three or four days, middle rectrices complete, 2nd primary on right and 3rd on left appearing, greater coverts keeping pace with secondaries, middle coverts breaking sheath, and scattering of lesser coverts in quill, scattered row of pin feathers running up to crown of head from back, also renewing on forehead, two rows breaking sheath on either side of abdomen and one more on breast, chin naked except from under coat of down. 22nd right 1st primary dropped. 23rd, under tail coverts equally along with corresponding rectrice. 27th, left 2nd primary one-half grown, 1st not yet cast, scattering of new feathers on crown, new growth extending out moderately on breast and back. July 5th, 4th from central rectrice appearing, breast and abdomen well covered through new feathers constantly appearing, interscapulars spread over the middle of the back, outside row practically completed, new pin feathers on neck and crown. 8th, extremely heavy moult including last remaining left 1st primary. 12th, renewal of primaries complete except left first, which is one-half. 19th much down pulling out on perch and twigs, secondaries apparently 7th to 10th just out of sheath, 1st and 4th not yet cast; last two pairs of rectrices, next to outer one-half, next to middle just breaking sheath; breast, abdomen, back of neck and head still with many pin feathers; inside of tibæ almost featherless. 26th, inside of tibæ and under wings next to body almost bare, some incoming pin feathers; still renewing on breast, and heavily on back and head; long axillars dropping rapidly, tail almost complete. 28th much down from under wings and flanks being moulted. August 2, primaries complete except left 1st which is three-quarters; secondaries and tertials scattering, five pairs com-

plete and four pairs two-thirds grown; two under primary coverts two-thirds only, all the rest complete; under wing coverts mostly complete toward tip, yet contains some pin feathers well forward, and gaps near body; lining of wings almost complete, greater wing coverts and scapulars apparently complete, middle and lesser coverts less forward; tail, except renewal of a broken middle rectrix, complete; all body feathers including inside of tibæ, complete. 28th, full feathered some days past, including completed length of second new middle rectrix. A little richer buff and not so heavily marked on breast as the male. Eye growing lighter, ashy-brown.

Moultiing commenced with the male "Tuck," on May 8th when the 10th primaries and coverts, also alula, were cast in pairs, and completed September 5th with the renewal of the secondaries.

RECAPITULATION—Female, primary moult began April 19 with the 10th, continuing in regular order in increasing intervals until 1st quill on left side was dropped July 9. The new quills generally breaking sheath in from 5 to 10 days after moult, 10th and 9th breaking forth April 25th, complete by May 9; after which there was a gradual slowing up the first requiring 24 days to perfect itself. Primary coverts moult and renew simultaneously with primaries.

Secondary moult May 8-July 20; renewal complete about August 28; occurs in rather irregular order, apparently in groups of 2nd and 3rd, 6th and 7th, then a break about 9th, several falling together, 4th and 1st completed last. Secondary coverts a little later than corresponding secondaries. Rectrices May 11-July 5, new breaking sheath May 17-July 19, complete June 18-August 2. Sequence—Central, outer, 3rd, 2nd from central, next to outer, next to central, 4 and 3, 5 and 2 coming in almost together.

Male—Primary moult began May 11, completed with 1st, Aug. 1; renewal, 10th on June 10, 1st on Aug. 28, complete. Rectrices, moulted May 28-July 25, sheath breaking June 2-Aug. 2, complete June 23-Aug. 16. Sequence—Middle, outer, 3rd, 2nd from central, next to central, next to outer. Feath-

ers nearly always moult and renew in pair on opposite sides of wings, tail or body, sometimes one feather will fall a few days ahead of its counterpart, and it has usually been on the right side.

SECOND POST NUPTIAL—In 1909 the female began moultting on April 11 and completed by August 31, the periods of heaviest moult of the body feathers occurred June 21–22, July 10–12, 24, 30–31. The renewal was visible about May 4, and the new plumage entirely completed on Sept. 6. The sequence of the primaries was the same as the first moult except that the 10th did not fall until after the 2nd and previous to the 1st. I was unable to solve the sequence of the secondaries, the moult and renewal taking place almost simultaneously about 1–3, 7–9, and 4–6. Sequence of rectrices—central, outer, 3rd, 2nd from central, next to central, next to outer; the central and outer, 3rd and 2nd from central, next to central and next to outer moulting and renewing almost together. Alula—3rd, 2nd, 1st and 4th, May 28–Aug. 22. The medium scapulars are the first to moult.

THIRD POST NUPTIAL—The full, rich plumage of last fall bleached out wonderfully during the winter, and the perfect adult plumage was attained under the same conditions and in the same order as last year's, except as follows:

PRIMARY MOULT.

May 15, left	9th; May 21, right	9th.
May " 8th; May	" 8th.	
May 22, "	7th; May 22,	" 7th.
June 1, "	6th; May 24,	" 6th.
June "	5th; May 31,	" 5th.
June 5, "	4th; June 8,	" 4th.
June "	3rd; June 13,	" 3rd.
June 22, "	10th; June 22,	" 10th.
		June 26, " 2nd.
July 22, "	1st; July 14,	" 1st.

SECONDARY MOULT, 1910

June 8, left	5th; May 31, right	5th.
June 20, "	2nd; June 18,	" 1st.
July 5 "	6th; July 1,	" 3rd.
July 7, "	3rd; July 16,	" 6th.
July 17, "	4th; July 18,	" 4th.
July 25, "	1st; July 24,	" 2nd.

The moult began about May 15, and was completed by Aug. 13; the renewal was complete by September 1. The upper and lower tail coverts agreeing in time of renewal with corresponding rectrix. The under primary coverts began with the shortest, about the time the 3rd primary is dropped, and the longest

axillers were dropped on June 18, followed irregularly by the smaller feathers. Up to July 24 the new underparts appeared devoid of yellow, but by the last of the month commenced to take on the rich tint. Freshly cast primaries, secondaries and scapulars, gathered about the nests of breeding birds, seem to indicate that my captive began and continued moulting several days in advance of the wild birds of this locality.

If this species has a regular winter moult in its southern home, I can find no evidence of it. All spring migrants I have seen with the exception of one Cuban specimen taken Feb. 2, 1906, which shows little wear, have the bleached out, well worn plumage similar to my captives of the same period. To me the dark phase is synonymous to the new, and the gray phase to the old, well worn plumage of the spring and early summer months.

The specimens J. H. Fleming has examined from his own and the Dwight collection, contain some very interesting South and Central American skins. An adult female, Palcaju, Peru, Nov. '02, has fresh primaries and secondaries, the latter probably the newest; all wing coverts are worn, there is a good deal of chestnut on scapulars and interscapulars. An adult male, Merida, Venezuela, Dec. 20, '03, is almost fully adult; first primary is nearly full grown, but still in quill at base of both wings, the second primary is new as are all the others except the third on the right which is slightly worn; the secondaries are slightly worn, the secondary coverts more so, a good deal of chestnut shows on the scapulars and back of the neck; the tail feathers are nearly fresh. Adult female, Merida, Venezuela, Mar. 24, '03, the secondaries and tail feathers are worn and some chestnut on interscapular region. Adult female, Carrilla, Costa Rica, April 5, '95, the feathers of wings and tail very little worn, the bird practically in full plumage. Adult female, Boqueti Chiriquí, Panama, April 25, '03, two of the secondaries very much worn, the rest and the primaries are fresh; the chestnut on interscapular region almost worn off.

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